STATE OF OKLAHOMA

2013 EMERGENCY MEDICAL SERVICES PROTOCOLS

INDEX OF PROTOCOLS

Oklahoma State Department of Health

STATE OF OKLAHOMA
2013 EMERGENCY MEDICAL SERVICES PROTOCOLS

Emergency Medicine University of Oklahoma
EMS DIVISION

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16CC Methylprednisolone (Solu-Medrol®)
16DD Midazolam (Versed®)
16EE Morphine Sulfate
16FF Naloxone (Narcan®)
16GG Hydromorphone (Dilaudid®)
16HH Norepinephrine (Levophed®)
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SECTION 1

GENERAL ASSESSMENT AND GENERAL SUPPORTIVE CARE

1A – MEDICAL GENERAL ASSESSMENT ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Assessment:
   - SCENE SAFETY
   - PROTECTIVE EQUIPMENT
   - Primary Survey
   - Secondary Survey (when appropriate)
2. Primary Survey Care:
   - Initiate cardiopulmonary resuscitation if indicated
   - Open airway
   - Support oxygenation/ventilation
   - Support circulation – Dysrhythmia care? Rate control? Hypotension care?
3. Minimize scene time in critical case unless working cardiac arrest
4. Enroute Care:
   - Reassess all primary care
   - Support oxygenation/ventilation
   - Vascular access
   - Secondary Survey (if able)
   - Keep patient warm/avoid hypothermia
5. Hospital per destination protocol..

In general, approach the assessment of medical (non-trauma) patients, in A-B-C order:

Airway: Evaluate the patency and mechanics of the airway. Is the patient able to oxygenate and ventilate? Rapid intervention may be required during the assessment phase if airway patency and protection is compromised.

Breathing: Expose the chest as required to accurately assess the mechanics of respiration (taking into account patient privacy/modesty if in public location). Note the rate, depth, and pattern of respirations and if any degree of respiratory distress or effort. Auscultate breath sounds bilaterally.

Liberally obtain pulse oximetry readings and in patients with respiratory difficulties, waveform capnography readings (if equipped, **Mandatory use if the patient is intubated).

Circulation: The adequacy of a patient's circulation is best assessed first by evaluating their level of consciousness and mental status. Next assess the location, rate, and character of the pulse. Then check a blood pressure – preferably, manually for at least the first reading. Apply the cardiac monitor (if equipped) liberally.

Cardiac Arrest is an exception to the above order. Aggressively initiate chest compressions and search for shockable rhythms at the appropriate intervals per Section 4 protocols.

Protocol 1A: Medical General Assessment – Adult & Pediatric, cont.

Many treatment decisions regarding airway management involve calculating the adult patient's Glasgow Coma Scale score using the following table:

Eyes Open		Best Motor Response		Best Verbal Response	
Spontaneously	4	Obeys verbal orders	6	Oriented, conversant	5
To command	3	Localizes painful stimuli	5	Disoriented, conversant	4
To pain	2	Withdraws	4	Inappropriate words	3
No response	1	Painful stimulus, flexion	3	Inappropriate sounds	2
		Painful stimulus, extension	2	No response	1
		No response	1		
				Maximum 15 points	

After addressing the A-B-C order in most medical patients, including evaluating and addressing any life-threatening conditions, minimize scene time and initiate timely transport to an appropriate emergency department in any setting of a time-sensitive medical condition.

Complete a head-to-toe assessment of the patient if the patient is relatively medically stable. Obtain relevant history of past and current medical problems, medications, allergies, and physicians/hospitals used in care plans to help guide further assessment.

Reassess patients frequently, typically at least every 10 minutes, and more often if critical illness is discovered and being treated. In the situations of an unstable patient, vital signs should be assessed every 5 minutes, especially if hemodynamic changes are occurring.

Assess and treat per symptom or illness specific protocols that follow in this protocol set.

Pediatric Assessment Comments:

1. Pediatric respiratory distress may look just like adult respiratory distress, presenting with:

slowing respirations	cyanosis
accessory muscle use	paleness
nasal flaring	lethargy/listlessness
retractions – intercostal or subcostal	irritability
tachypnea	tachypnea
mottling	grunting
stridor	

Protocol 1A: Medical General Assessment – Adult & Pediatric, cont.

2. Vital signs vary with age. In general, the younger the patient, the faster the respiratory rate, the faster the heart rate, and the lower the blood pressure:

AGE	HEART RATE (BPM)	RESP. RATE (BPM)	SYSTOLIC BP (mmHg)
Premature	100-190	40-60	
Neonate	90-190	30-60	50-70
6 months	80-180	25-40	60-110
1 year	80-150	20-40	70-110
3-4 years	80-140	20-30	80-115
5-6 years	70-120	20-25	80-115
7-8 years	70-110	20-25	85-120
11-12 years	60-110	15-20	95-135

The average normal systolic BP can also be estimated by: 80 + (2 x age) in years.
Lower limits of normal systolic BP can also be estimated by: 70 + (2 x age) in years.

3. The following table can be used to calculate Glasgow Coma Scale scores in pediatric patients, especially those under 4 years of age. Most pediatric patients above the age of 4 years will be able to be assessed for Glasgow Coma Scale scores using the adult table.

Pediatric Glasgow Coma Scale Scores

Points*	Best eye	Best verbal		Best Motor
6	--	--		obeys
5	--	smiles, oriented to sound, follows objects, interacts		localizes pain
		Crying	**Interaction**	
4	spontaneous	consolable	inappropriate	withdraws to pain
3	to speech	inconsistently consolable	moaning	flexion (decorticate)
2	to pain	inconsolable	restless	extensor (decerebrate)
1	none	none	none	none

* Range of total points:
3 (worst) to 15 (normal)

Medical Literature References
1A – Medical General Assessment – Adult & Pediatric

1. Travers AH, Rea TD, Bobrow BJ, Edelson DP, Berg RA, Sayre MR, Berg MD, Chameides L, O'Connor RE, Swor RA. Part 4: CPR overview: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation.* 2010;122(suppl 3):S676–S684.
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1B - TRAUMA GENERAL ASSESSMENT ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Assessment:
   - SCENE SAFETY
   - PROTECTIVE EQUIPMENT
   - Primary Survey
   - "Trauma Alert" to receiving ED if indicated
   - Secondary Survey (when appropriate)
2. Primary Survey Care:
   - Control arterial bleeding
   - Open airway
   - Seal "sucking" chest wound(s)
   - Needle thoracostomy for closed chest tension pneumothorax
3. Minimize scene time in critical case.
4. Enroute Care:
   - Reassess all primary care
   - Support oxygenation/ventilation
   - Vascular access
   - Secondary Survey (if able)
   - Keep patient warm/avoid hypothermia
5. Hospital per destination protocol..

Before entering any trauma scene, ensure your personal safety. Do not attempt patient contact until hazards can be appropriately mitigated. In addition to scene safety, consider mechanisms of injury, number of patients, and special equipment/extrication needs.

All trauma patients should be assessed utilizing primary, secondary, and reassessment surveys.

The **primary survey** is to be conducted on all trauma patients. It is designed to rapidly identify life-threatening or potentially life-threatening injuries. The primary survey should be completed within 2 minutes of patient contact. THE PRIMARY SURVEY IS ONLY INTERRUPTED FOR LIFE-THREATENING ARTERIAL BLEEDING, AIRWAY OBSTRUCTION, OR RESPIRATORY/CARDIAC ARREST. The following are the steps of the **primary survey**:

1) Manually stabilize the cervical spine while assessing the airway and level of consciousness.
2) Evaluate breathing – present? rapid? normal? slow? shallow?
3) Evaluate circulation – carotid and radial pulses? Control external hemorrhage.
4) Exam the head for deformity, contusions, abrasions, penetrations, burns, lacerations, or swelling ("DCAP-BLS").
5) Exam the neck for deformity, contusions, abrasions, penetrations, burns, lacerations, swelling ("DCAP-BLS"), or subcutaneous emphysema.
6) Exam the chest for deformity, contusions, abrasions, penetrations, burns, lacerations, swelling ("DCAP-BLS"), or paradoxical movement.
7) Auscultate the chest for breath sounds in the mid-axilla bilaterally – present? equal?
8) Exam the abdomen and pelvis for deformity, contusions, abrasions, penetrations, burns, lacerations, or swelling ("DCAP-BLS").
9) Exam the extremities for deformity, contusions, abrasions, penetrations, burns, lacerations, or swelling ("DCAP-BLS"), and pulse, movement, sensation.

Protocol 1B: Trauma General Assessment – Adult & Pediatric, cont.

Primary survey interventions include airway management (See Section 2 Protocols – Airway), sealing open chest wounds, needle thoracostomy for suspected tension pneumothorax (See Protocol 10E – Needle Thoracostomy), oxygen administration and controlled any obvious external hemorrhage. Remember to expose the patient as needed to conduct an appropriate exam.

Any trauma patient with altered level of consciousness, abnormal respiration, abnormal circulation, or signs/conditions likely to lead to shock (distended abdomen, pelvic instability, bilateral femur fractures) should be rapidly immobilized and transported after the completing the primary survey. These are "LOAD & GO" patients.

The **secondary survey** is always done enroute on critical patients. If no critical conditions are found in the primary survey, the secondary survey may be conducted on the scene and should be completed within 5 minutes after the primary survey is completed. The following are the steps of the **secondary survey**:

1) Obtain vital signs (pulse, respiratory rate, blood pressure, pulse oximetry)
2) Obtain history of traumatic event and pertinent patient medical history (allergies, medications, past illness/injury, last oral intake)
3) Head to toe exam – look for "DCAP-BLS" in every body area. Calculate GCS score
4) Perform indicated bandaging and splinting

The **reassessment survey** is an abbreviated exam after interventions and done at least every five minutes for critical patients. The following are the steps of the **reassessment survey**:

1) Repeat the primary survey
2) Repeat vital signs
3) Repeat GCS score calculation
4) Check every intervention – proper placement of intubation? Proper placement of IV/IO?
5) Check results of every intervention – improved oxygenation/ventilation? Improved blood pressure?

Medical Literature References
1B – TraumaGeneral Assessment – Adult & Pediatric

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1C - GENERAL SUPPORTIVE CARE ADULT & PEDIATRIC

TREATMENT PRIORITIES
1. Assessment:
   - SCENE SAFETY
   - PROTECTIVE EQUIPMENT
   - ABCs unless cardiac arrest
   - CAB if cardiac arrest
   - Early vital signs
   - Get best history possible
2. Evaluate/treat underlying medical cause per protocol(s)
3. Early transport & ED notification for patients with time sensitive conditions (Resp Failure, STEMI, Stroke)

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

IF CHIEF COMPLAINT IS ***MEDICAL*** IN NATURE, CHOOSE THE PROTOCOL THAT BEST FITS THE PATIENT'S FOREMOST SYMPTOMS, WITH PRIORITY SYMPTOMS TAKING PRECEDENCE

QUESTIONS TO ADDRESS SCENE SAFETY ISSUES

EMR | EMT

AIRWAY MANAGEMENT
SUPPORT OXYGENATION/VENTILATION

OBTAIN VITAL SIGNS

APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (when indicated & if equipped)
TRANSMIT 12-LEAD ECG TO RECEIVING HOSPITAL
MONITOR END – TIDAL CO_2 & WAVEFORM CAPNOGRAPHY
(when indicated & if equipped, **Mandatory use if pt intubated)

ASSIST PT WITH PT'S OWN MEDICATION IF DIRECTED BY PROTOCOL(S)

DETERMINE BLOOD GLUCOSE/TREAT HYPOGLYCEMIA PER PROTOCOL

EMT-I85 | AEMT

INTUBATE IF INDICATED

IV/IO ACCESS IF INDICATED
FLUID BOLUS AS DIRECTED BY SPECIFIC MEDICAL PROTOCOL(S)

MEDICATION ADMINISTRATION PER SPECIFIC MEDICAL PROTOCOL(S)

PARAMEDIC

CONTINUOUS TREATMENT AND ASSESSMENT PER SPECIFIC MEDICAL PROTOCOL(S)
INTERPRETATION OF 12-LEAD ECGS (when indicated & if equipped)
TRANSPORT ASAP PER DESTINATION PROTOCOLS

Clinical Operational Notes (All Field Provider Levels):

1. The practice of EMS medicine is built upon the foundation of "taking medical care to the patient". To achieve this objective, appropriate equipment (airway equipment kit, med/trauma equipment kit, suction device, AED/Cardiac Monitor/Defibrillator, patient packaging equipment) should be brought to the patient's side to minimize critical treatment delays in secondarily fetching equipment from the response apparatus.

2. Minimize active movement on the patient's part in settings of suspected myocardial ischemia, stroke, and dyspnea. Move and package the patient for transport with safety considerations for all involved.

Medical Literature References
1C – General Supportive Care – Adult & Pediatric

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1D - TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE ADULT & PEDIATRIC

TREATMENT PRIORITIES
1. Assessment:
   - SCENE SAFETY
   - PROTECTIVE EQUIPMENT
   - Primary Survey
   - "Trauma Alert" to receiving ED if indicated
   - Secondary Survey (when appropriate)
2. Primary Survey Care:
   - Control arterial bleeding
   - Open airway
   - Seal "sucking" chest wound(s)
   - Needle thoracostomy for closed chest tension pneumothorax
3. Minimize scene time in critical case.
4. Enroute Care:
   - Reassess all primary care
   - Support oxygenation/ventilation
   - Vascular access
   - Secondary Survey (if able)
   - Keep patient warm/avoid hypothermia
5. Hospital per destination protocol..

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

IF CHIEF COMPLAINT IS ***TRAUMATIC*** IN NATURE, CHOOSE THE PROTOCOL THAT BEST FITS THE PATIENT'S FOREMOST SYMPTOMS, WITH PRIORITY SYMPTOMS TAKING PRECEDENCE

QUESTIONS TO ADDRESS SCENE SAFETY ISSUES

EMR / EMT

SERIOUS HEMORRHAGE CONTROL:
TOURNIQUET IF INDICATED
BANDAGE/DRESSING/DIRECT PRESSURE
PRESSURE DRESSING IF INDICATED (if equipped)
TOPICAL HEMOSTATIC AGENT IF INDICATED (if equipped)

AIRWAY MANAGEMENT
SUPPORT OXYGENATION/VENTILATION

OBTAIN VITAL SIGNS/ASSESS FOR AND TREAT SHOCK

PREVENT HYPOTHERMIA

EMT-I85 / AEMT

INTUBATE IF INDICATED

IV/IO ACCESS IF INDICATED
FLUID BOLUS AS DIRECTED BY SPECIFIC TRAUMA PROTOCOL(S)

PARAMEDIC

CRICOTHYROTOMY IF INDICATED

NEEDLE THORACOSTOMY IF TENSION PNEUMOTHORAX SUSPECTED

CONTINUOUS TREATMENT AND ASSESSMENT PER SPECIFIC TRAUMA PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Clinical Operational Note (All Field Provider Levels): The practice of EMS medicine is built upon the foundation of "taking medical care to the patient". To achieve this objective, appropriate equipment (airway equipment kit, med/trauma equipment kit, suction device, patient packaging equipment) should be brought to the patient's side to minimize critical treatment delays in secondarily fetching equipment from the response apparatus.

Medical Literature References
1D– Trauma and Hypovolemic Shock Supportive Care – Adult & Pediatric

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SECTION 2

AIRWAY

2A – AIRWAY ASSESSMENT ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

The following principles should be followed to allow optimum assessment and care of the airway without unnecessary intervention.

1. Use the least invasive method of airway management appropriate to the patient.
2. Use a method of airway management with which you are procedurally comfortable.
3. Use meticulous suctioning to keep the airway clear of debris.
4. Monitor continuously to be sure that oxygenation/ventilation is as effective as intended and as needed.
5. Understand the difference between these various aspects of airway management:

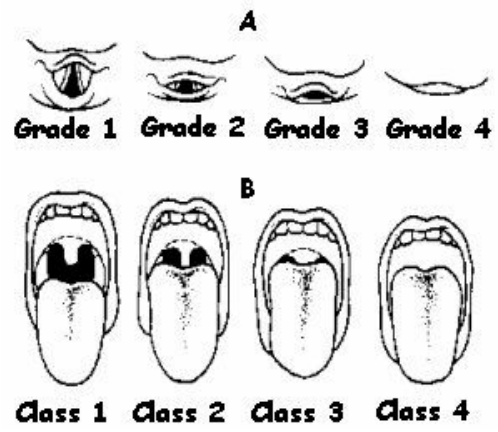
   A. Patency: how open and clear is the airway, free of foreign substances, blood, vomitus, and tongue obstruction?
   B. Ventilation: the amount of air the patient is able to inhale and exhale in a given time, promoting exhalation of carbon dioxide. Use waveform capnography if equipped.
   C. Oxygenation: the amount of oxygen the patient is able to convey to the circulation for tissue/organ perfusion. Use pulse oximetry when available.

Although the dynamics of EMS care often dictate rapid decisions in critical skill performance, assessment for difficult airway characteristics should precede intubation attempt(s). Several methods of evaluating airway-related anatomy exist. One commonly used mnemonic in emergency airway care is “LEMON”, which stands for:

Look externally (Heavy perioral facial hair? Mis-shaped or missing dentition?)
Evaluate 3-3-2 (Can at least three fingers be placed in the vertical axis of the mouth? Can at least three fingers be placed in the space between the chin apex and the top of the neck? Can at least 2 fingers fit between the top of thyroid cartilage and the top of the neck? Three “yes” answers predicts lesser anatomical difficulty in establishing intubation.)
Mallampati scoring – see Image 1.(View of posterior pharyngeal structures correlated to anticipated laryngeal view.)
Obstructions (Oral or upper neck masses? Large tongue?)
Neck mobility (Unable to assess if concerns of cervical spine injury.)

Protocol 2A - Airway Assessment - Adult & Pediatric, cont.

Mallampati Scoring:



The LEMON criteria, including Mallampati scoring, is easiest to apply to compliant patients without acute respiratory distress and without need for emergent intubation. By nature, these are NOT the patients that EMS professionals are tasked with managing. However, the concepts expressed in these criteria can help in predicting more difficult invasive airway management. EMS professionals should always work in developing "Plan B" approaches in airway management to anticipate and be capable of effective care when facing obstacles to usually successful airway management methods.

The following directives guide the approach to typical medical and trauma-related airway problems. They assume the treating EMS professional is skilled in the various procedures appropriate for their scope of practice. Advanced procedures should only be attempted if clinically indicated after less invasive measures fail or are futile to attempt. Individual cases may require modification of these protocols. Airway management decisions and actions should always be thoroughly documented in the patient care report.

Medical Respiratory Arrest:

1. Open airway using head tilt-chin lift.
2. Oxygenate/ventilate with Bag-Valve-Mask (BVM) with supplemental O_2 near 100% FiO_2.
3. Insert nasopharyngeal airway(s) and/or oropharyngeal airway as needed for patency.
4. Suction as needed.
5. If above actions do not achieve needed oxygenation/ventilation AND if EMT is highest licensed EMS professional available, place supraglottic airway.
6. If actions in steps 1-4 do not achieve needed oxygenation/ventilation AND if licensed as EMT-I85 or higher, intubate.

Protocol 2A - Airway Assessment - Adult & Pediatric, cont.

Trauma Respiratory Arrest:

1. Open airway using jaw thrust maneuver with another EMS professional applying in-line stabilization of cervical spine.
2. Oxygenate/ventilate with Bag-Valve-Mask (BVM) with supplemental O_2 near 100% FiO_2.
3. Insert nasopharyngeal airway(s) only if no head/facial trauma and/or oropharyngeal airway as needed for patency.
4. Suction as needed.
5. If above actions do not achieve needed oxygenation/ventilation AND if EMT is highest licensed EMS professional available, place supraglottic airway while maintaining in-line stabilization of cervical spine.
6. If actions in steps 1-4 do not achieve needed oxygenation/ventilation AND if licensed as EMT-I85 or higher, intubate while maintaining in-line stabilization of cervical spine.

Medical Respiratory Insufficiency (Oxygenation, Ventilation, or Both):

1. Establish patency – either spontaneously by patient, patient positioning, or with nasopharyngeal airway(s).
2. Suction as needed.
3. Apply supplemental O_2 by nasal cannula, non-rebreather mask, BVM, or if EMT license or higher, Bi/CPAP as patient condition indicates need for oxygenation assist.
4. Assist ventilations by BVM, or if EMT license or higher, Bi/CPAP as patient condition indicates need for ventilation assist.
5. If actions in steps 1-4 do not achieve needed oxygenation/ventilation AND if licensed as EMT-I85 or higher, intubate.

Trauma Respiratory Insufficiency (Oxygenation, Ventilation, or Both):

1. Establish patency – either spontaneously by patient, patient positioning, or if no head/facial trauma with nasopharyngeal airway(s).
2. Suction as needed.
3. Apply supplemental O_2 by nasal cannula, non-rebreather mask, BVM as patient condition indicates need for oxygenation assist.
4. Assist ventilations by BVM as patient condition indicates need for ventilation assist.
5. If actions in steps 1-4 do not achieve needed oxygenation/ventilation AND if licensed as EMT-I85 or higher, intubate.

Medical Literature References
2A – Airway Assessment – Adult & Pediatric

1. Travers AH, Rea TD, Bobrow BJ, Edelson DP, Berg RA, Sayre MR, Berg MD, Chameides L, O'Connor RE, Swor RA. Part 4: CPR overview: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation.* 2010;122(suppl 3):S676–S684.
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2B - AIRWAY ESTABLISHMENT / OBSTRUCTION MANAGEMENT ADULT & PEDIATRIC

TREATMENT PRIORITIES

1, Remove obstruction
2. Oxygenation/Ventilation support

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

VERIFY IF PATIENT IS CHOKING
AVOID BACK SLAPS
ENCOURAGE COUGHING AND BREATHING EFFORTS
INSTRUCT CALLER IN HEIMLICH MANEUVER IF INDICATED

EMR / EMT

GENERAL SUPPORTIVE CARE

ADULTS: HEIMLICH MANEUVER OR ABDOMINAL THRUSTS IF SUPINE
(CHEST COMPRESSIONS IF PREGNANT OR MORBID OBESITY)
PEDIATRIC: HEIMLICH MANEUVER OR ABDOMINAL THRUSTS IF SUPINE
(CHEST COMPRESSIONS IF < 1 YR OLD)

OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR (if equipped)

EMT OR HIGHER LICENSE:
MEASURE END – TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, **Mandatory use if pt intubated)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT- I85 / AEMT

DIRECT LARYNGOSCOPY & REMOVAL OF FOREIGN BODY

ADULT: INTUBATE IF INDICATED

IV ACCESS (IF NEEDED)

PARAMEDIC

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED
ADULT: CRICOTHYROTOMY FOR COMPLETE, INTRACTABLE OBSTRUCTION
PEDIATRIC: PT > 6 YRS OLD, CRICOTHYROTOMY FOR COMPLETE, INTRACTABLE OBSTRUCTION

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

CONSULT OLMC IF AIRWAY OBSTRUCTION PERSISTS DESPITE ABOVE MEASURES

Medical Literature References
2B Airway Establishment/Obstruction Management – Adult & Pediatric

1. Travers AH, Rea TD, Bobrow BJ, Edelson DP, Berg RA, Sayre MR, Berg MD, Chameides L, O'Connor RE, Swor RA. Part 4: CPR overview: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation.* 2010;122(suppl 3):S676–S684.
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2C - AIRWAY SUCTIONING ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:

1. Trauma to the face and/or upper airway, with potential or actual airway obstruction.
2. Vomitus, food boluses or other liquid foreign material in airway.
3. Excess secretions or pulmonary edema fluid in upper airway (or lungs with endotracheal tube in place).
4. Amniotic fluid in naso/oropharynx of newborn with obvious obstruction to spontaneous breathing or who require positive-pressure ventilation.
5. Meconium in naso/oropharynx of non vigorous newborn.

Contraindications:

1. Airway patency effective without additional suctioning assistance.
2. Amniotic fluid or meconium in naso/oropharynx of vigorous, non-dyspneic newborn.

Technique:

A. Open airway and inspect for visible foreign material.
B. Turn patient on side if possible to facilitate clearance of liquid foreign material.
C. Remove large or obvious foreign particulates with gloved hands. Sweep finger ACROSS posterior pharynx and clear material out of mouth in adults or if visible material in pediatrics.
D. Power on suction machine.
E. Suction of oropharynx:

   1. Attach tonsil tip (or use open end of suction tubing for large amounts of debris).
   2. Oxygenate and ventilate the patient prior to the procedure as needed.
   3. Insert tip into oropharynx under direct vision, with sweeping motion.
   4. Continue intermittent suction interspersed with active oxygenation by mask. Use positive pressure ventilation if needed.
   5. If suction becomes clogged, dilute by suctioning water or normal saline to clean tubing. If suction clogs repeatedly, use connecting tubing alone, or manually remove large debris.

PROTOCOL 2C: Airway Suctioning – Adult & Pediatric, cont.

Technique, cont.:

F. Catheter suction of endotracheal tube:

1. Attach suction catheter to tubing of suction device (leaving suction end in sterile container).
2. Ventilate patient 4 - 5 times for presuction oxgenation.
3. Detach bag from endotracheal tube and insert sterile tip of suction catheter without suction.
4. When catheter tip has been gently advanced to estimated carina depth, apply suction and withdraw catheter slowly.
5. Rinse catheter tip in sterile water or normal saline.
6. Ventilate patient before each suction attempt.

Precautions:

1. Suctioning, particularly through endotracheal tubes, always risks suctioning the available oxygen as well as the fluid from the airway. In most situations, limit the suction time to a few seconds while the catheter is being withdrawn. This precaution should NOT be followed when vomitus or other material continues to well up and completely obstruct airway. Then suctioning must be continued until an airway is reestablished, with intermittent oxygenation and ventilation performed to avoid prolonged lack of oxygen.

2. Use equipment large enough for the job at hand. Large, solid matter will not be cleared out with hard tonsil suckers. Large amounts of particulate matter require open-ended suction using connecting tubing and physical removal with a gloved hand (using bite precautions).

3. The catheter and tubing will require frequent rinsing with water or normal saline to permit continued suctioning. Have a container of water or normal saline at hand before you begin. Use gauze to remove large material from the end of the catheter.

4. Do not insert a suction catheter with the suction functioning. Suction only on withdrawal of the catheter.

Complications:

1. Hypoxia due to excessive suctioning time without adequate ventilation between attempts.
2. Persistent obstruction due to inadequate tubing size for removal of debris.
3. Lung injury from aspiration of stomach contents due to inadequate suctioning.
4. Asphyxia due to recurrent obstruction if airway is not monitored after initial suctioning.
5. Trauma to the posterior pharynx from forced use of equipment.
6. Vomiting and aspiration from stimulation of gag reflex.
7. Induction of cardio-respiratory arrest from vagal stimulation.

Medical Literature References
2C Airway Suctioning– Adult & Pediatric

1. Travers AH, Rea TD, Bobrow BJ, Edelson DP, Berg RA, Sayre MR, Berg MD, Chameides L, O'Connor RE, Swor RA. Part 4: CPR overview: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation.* 2010;122(suppl 3):S676–S684.
2. Berg RA, Hemphill R, Abella BS, Aufderheide TP, Cave DM, Hazinski MF, Lerner EB, Rea TD, Sayre MR, Swor RA. Part 5: Adult basic life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2010;122(suppl 3):S685–S705.
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2D - BAG VALVE MASK (BVM) MANAGEMENT ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:

1. Respiratory arrest.
2. Inadequate oxygenation/ventilation not improved by non-positive pressure methods or immediately obvious that will not improve by non-positive pressure methods.

Contraindications:

1. Acute dyspnea of lesser severity able to be managed without BVM management
2. Active or suspected impending emesis

Technique:

Utilize the following mnemonic to guide correct BVM management:

C Hold mask by **c-clamp** (now referred to as e-clamp) formed by one, preferably both hands
O Use an **oropharyngeal and/or nasopharyngeal airway(s)**
P **Place in a sniffing position** to open the airway (***unless spinal injury suspected)
E **Elevate the jaw** to additionally open the airway
S **Seal the mask** over the mouth and nose without excessive downward force

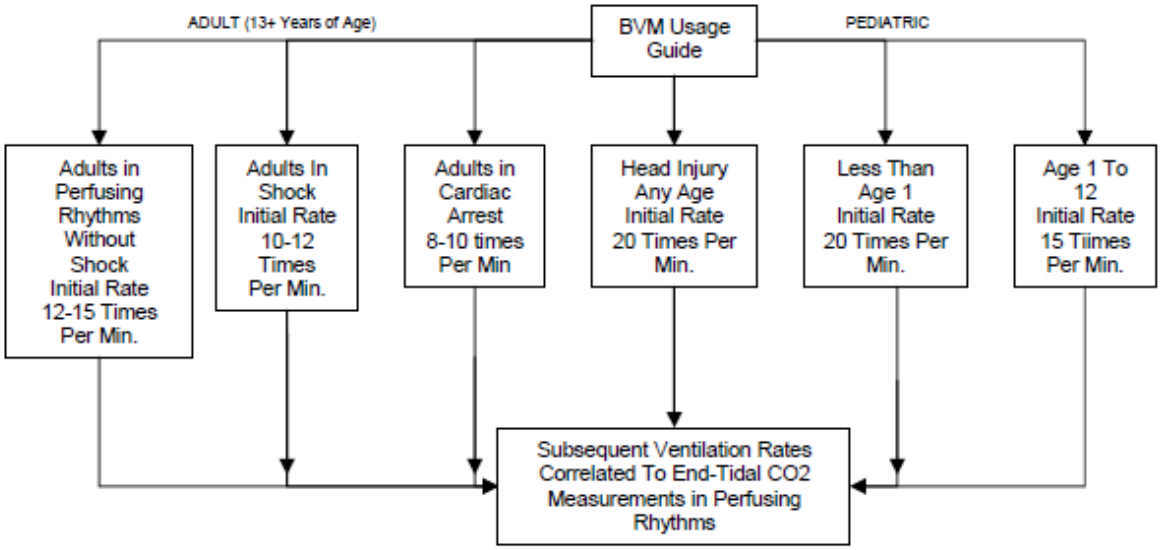
S Use **Sellick maneuver** if indicated (**BURP** = backward, upward, rightward pressure) on thecricoid cartilage to partially occlude the esophagus in the unconscious patient. Do notutilize if ventilations are effective and without onset of gastric distention. Be ready foremesis when releasing Sellick maneuver.
O Use 100% **oxygen** concentration (FiO2 = 1.0) to start and titrate down as indicated
S **Squeeze the bag slowly and smoothly** (over 1 second ventilation periods) delivering adequate ventilation volume (approx. 6-8 mL of air/kg if resp/cardiac arrest or shock; 8-10 mL of air/kg up to 1000 mL if non-shock hemodynamics) and provide adequate exhalation time.

PROTOCOL 2D: Bag Valve Mask (BVM) Management – Adult & Pediatric, cont.

BVM technique that promotes optimal oxygenation/ventilation takes two, sometimes three EMS professionals to achieve.

Utilization of the above technique will promote improved oxygenation/ventilation, while reducing potential for gastric insufflation, vomiting, and aspiration.

Utilize the flowchart below to guide BVM management ventilation rates:



Medical Literature References
2D – Bag Valve Mask (BVM) Management – Adult & Pediatric

1. Travers AH, Rea TD, Bobrow BJ, Edelson DP, Berg RA, Sayre MR, Berg MD, Chameides L, O'Connor RE, Swor RA. Part 4: CPR overview: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation.* 2010;122(suppl 3):S676–S684.
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2E – SUPRAGLOTTIC AIRWAYS ADULT & PEDIATRIC

EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:

1. Hypoxia and/or hypoventilation refractory to non-invasive airway/respiratory management.
2. Airway protection to reduce aspiration in the setting of sustained altered mental status with a Glasgow Coma Scale Score < 8.
3. Three unsuccessful oral and/or nasal intubation attempts in the above settings. An intubation attempt has occurred when the tip of the endotracheal tube is advanced beyond the gum line or into a nare. Attempts are counted per patient not per intubator. It is not necessary to first attempt intubation if a difficult airway is anticipated or visualized. A supraglottic airway may be used as the first–line airway in these cases.

Contraindications:

1. Ability to maintain oxygenation and ventilation by less invasive methods, such as Bag-Valve-Mask ventilation.
2. Intact gag reflex
3. Known esophageal disease
4. Ingestion of caustic substance (e.g. lye, acids) or extensive airway burns
5. Tracheotomy or laryngectomy
6. Suspected Foreign Body Airway Obstruction
7. (Relative Contraindication): Patient size outside of manufacturer recommended range for airway size used. The supraglottic airway may be utilized in such patients if the fit of the airway allows for appropriate oxygenation and ventilation of the patient.

Precaution:

Emerging medical literature indicates concerns regarding reduction in cerebral arterial flow and impedance of cerebral venous return due to pressure effects of supraglottic airways. Supraglottic airways should not be utilized when other methods of airway management are capable of achieving needed oxygenation/ventilation.

PROTOCOL 2E: Supraglottic Airways – Adult & Pediatric, cont.

Technique (King LT-D™ – see protocol Special Note):

Patient Size	King LT-D™ Size	15 mm Connector Color	Typical Cuff Inflation
35 - 45 inches height or 12-25 kg	2	Green	25 – 35 mL
41 - 51 inches height or 25-35 kg	2.5	Orange	30-40 mL
4 ft – 5 ft height	3	Yellow	45 – 60 mL
5 ft – 6 ft height	4	Red	60 – 80 mL
6 ft + height	5	Purple	70 – 90 mL

The King LT-D™ Airway has two cuffs that inflate from one port. The smaller, distal cuff inflates in the esophagus and serves to isolate the laryngopharynx from the esophagus. The larger, proximal cuff inflates at the base of the tongue and serves to isolate the laryngopharynx from the oropharynx and nasopharynx.

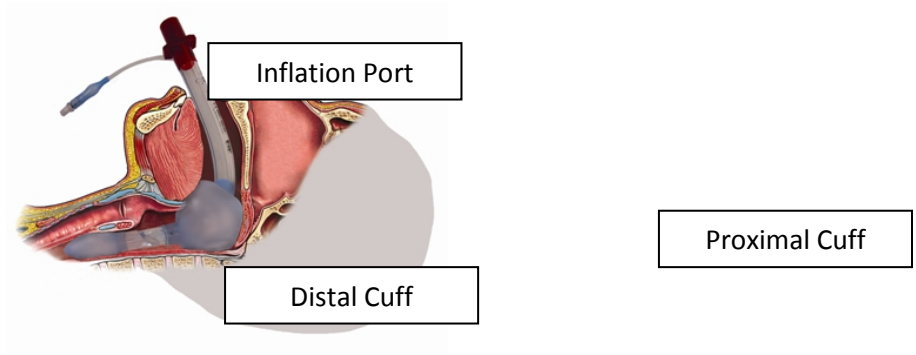


Illustration of Correct Placement King LT-D™ Airway (Size 4 Shown)

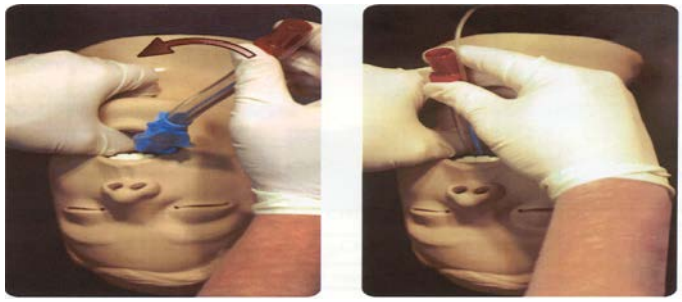
To prepare the King LT-D™Airway:

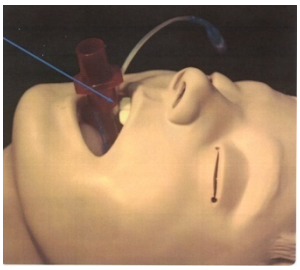
- Test cuffs inflation by injecting air into the cuffs through the inflation port.
- Remove all air from cuffs prior to insertion.
- If lubricant is applied to the posterior aspect of the tube, take care to avoid the introduction of lubricant in or near the ventilation portals in the airway.

PROTOCOL 2E: Supraglottic Airways – Adult & Pediatric, cont.

- Hold the King LT-D™Airway at the connector with dominant hand (right hand dominant depicted)
- With non – dominant hand, hold mouth open and apply chin lift, **unless contraindicated by C – spine precautions or patient position**
- With a lateral approach from the right, introduce tip into mouth
- Laryngoscope(by EMT- I85 or higher license) may allow easier oropharynx passage

- Advance the tip behind the base of the tongue while rotating tube back to midline, so that the blue orientation line faces the chin of the patient





- Without exerting excessive force, advance tube until base of connector is aligned with teeth or gums
- Inflate cuffs with supplied syringe – use minimum mL necessary to achieve seal for appropriate oxygenation/ventilation. **Excessive cuff inflation may compromise cerebral blood flow!**

- Attach bag-valve to KingLT-D™Airway
- Gently ventilate the patient while withdrawing the tube until ventilation is easy (without significant resistance)
- Confirm proper position by auscultation of epigastrum and chest, physiologic changes, and waveform capnography (if equipped ;capnography is not required for King LT-D™ Airway placement.

PROTOCOL 2E: Supraglottic Airways – Adult & Pediatric, cont.

Removal of the KING LT - D™Airway:

1. Once in correct position, the KING LT–D™ Airway should be well tolerated until return of airway reflexes.
2. Suction MUST always be available when a King LT–D™ Airway is removed. Anticipate vomiting with removal, positioning patient in lateral recumbent position unless contraindicated.
3. Completely deflate cuffs prior to removal.

Additional Information:

1. If unable to place a King LT–D™ Airway in three attempts, utilize bag valve mask ventilation.
2. Ventilation portals of the KingLT–D™ Airway must align with the laryngeal inlet for adequate oxygenation and ventilation. Insertion depth should be adjusted to optimize ventilation.
3. Ensure cuffs are not over inflated. Inflate the cuffs with the minimum volume necessary to seal the airway. If the patient becomes more alert, it may be helpful in retaining the tube to remove a slight amount of air from the cuffs.
4. Most unsuccessful insertion attempts relate to the failure to keep the tube in a midline position during insertion.
5. Do not force the tube during insertion; this may result in trauma to the airway or esophagus.
6. Document any complications as well as all methods used to ensure appropriate placement of the KingLT–D™ Airway including auscultation of absence of epigastric sounds and presence of lung sounds, physiologic changes (chest rise and fall, improved oxygenation, condensation in KingLT–D™ Airway with exhalations), and waveform capnography readings (if equipped).
7. Assess and document placement verification of the King LT–D™ Airway after patient moves and periodically throughout care and transportation.

Special Note:

This protocol utilizes the King LT–D™ Airway to illustrate one method of placing a supraglottic airway. The Oklahoma Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the King LT–D™ Airway for supraglottic airway use by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in establishing and maintaining a supraglottic airway if not using the King LT–D™ Airway.

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2E – Supraglottic Airways – Adult & Pediatric

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2F – COMBITUBE® AIRWAY ADULT

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

Indications:

1. Hypoxia and/or hypoventilation refractory to non-invasive airway/respiratory management.
2. Airway protection to reduce aspiration in the setting of sustained altered mental status with a Glasgow Coma Scale Score <8.
3. Three unsuccessful oral and/or nasal intubation attempts in the above settings. An intubation attempt has occurred when the tip of the endotracheal tube is advanced beyond the gum line or into a nare. Attempts are counted per patient not per intubator. It is not necessary to first attempt intubation if a difficult airway is anticipated or visualized. The Combitube® may be used as the first–line airway in these cases.

Contraindications:

1. Ability to maintain oxygenation and ventilation by less invasive methods, such as Bag-Valve-Mask ventilation.
2. Patients ≤ 16 years of age.
3. Patients < 5 feet tall.
4. Intact gag reflex.
5. Known esophageal disease.
6. Ingestion of caustic substance (e.g. lye, acids).
7. Tracheotomy or laryngectomy.
8. Suspected Foreign Body Airway Obstruction
9. Waveform capnography not immediately available.
10. Three unsuccessful Combitube® attempts in the indicated settings. A Combitube® attempt has occurred when the tip of the Combitube® is advanced beyond the gum line. Attempts are counted per patient not per Combitube® placer.

Technique:

1. Prior to insertion, test cuff integrity by inflating each cuff with the prescribed volume of air. Inflate the proximal pharyngeal cuff (Blue Pilot Balloon) with 100 mL of air. Inflate the distal white esophageal cuff (White Pilot Balloon) with 15 mL of air. After checking cuff integrity, deflate cuffs.

PROTOCOL 2F: Combitube® Airway – Adult, cont.

2. Lubricate tube to facilitate insertion.

3. In the supine patient, lift the tongue and jaw upward with one hand (Figure 1). When facial trauma has resulted in sharp, broken teeth or dentures, remove dentures and exercise extreme caution when passing the Combitube® into the mouth to prevent the cuffs from tearing. Alternatively, the use of a laryngoscope to assist in opening the oropharynx/hypopharynx has been shown to improve Combitube® passage. Regardless of technique, maintain cervical spine stabilization/immobilization in patients with possible spinal injury.

4. With the other hand, hold the Combitube® so that it curves in the same direction as the natural curvature of the pharynx. Maintain a mid-line position of the Combitube®. Insert the tip into the mouth, advance in a downward curved movement until the teeth lie between the two printed bands (Figure 2). DO NOT FORCE THE COMBITUBE®. If the tube does not advance easily, redirect it or withdraw and reinsert.

5. Inflate #1 Blue pilot balloon with 100 mL of air using a 140 mL syringe (Figure 2). The large latex cuff will fill and may cause the Combitube® to move slightly from the patient's mouth. This is to be expected. Additional air may be added to the cuff if an inadequate seal is detected during ventilation. Inflate using minimum mL necessary to achieve seal for appropriate oxygenation/ventilation. Excessive cuff inflation may compromise cerebral blood flow!

6. Inflate #2 White pilot balloon with 15 mL of air using a 20 mL syringe (Figure 3).

<u>Confirmation of Combitube® Placement</u>:

The following sequence is to be used (and its use documented) to verify and maintain correct Combitube® placement without fail:

1. **Detection of End-tidal carbon dioxide.** End-tidal carbon dioxide ($EtC0_2$) detection shall be confirmed within 60 seconds of Combitube® tube placement. The capnography adaptor is to be placed at the bag-valve device-Combitube® long Blue tube No. 1 (Figure 4) interface for the first ventilation. The normal waveform indicating correct Combitube® placement reflects a rapid upstroke with the beginning of exhalation, the exhalation plateau ending at the point of $EtC0_2$ measurement, and a rapid downstroke with the beginning of inhalation. Any waveform that does not show rhythmic rise and fall correlating with assisted ventilations indicates inadequate oxygenation and ventilation and the bag-valve device should be switched to the shorter Clear tube No. 2 (Figure 5). If waveforms do not show rhythmic rise and fall correlating with assisted ventilation, indicating inadequate oxygenation and ventilation, the Combitube® must be removed. **To be perfectly clear, the use of a Combitube® for ongoing oxygenation and ventilation is dependent upon continuously measurable capnography waveforms**. See also Protocol 3H - Capnography for discussion of $EtCO_2$ values.

PROTOCOL 2F: Combitube® Airway – Adult, cont.

Confirmation of Combitube® Placement , cont.:

2. **Auscultation. Auscultate the epigastrum.** If epigastric sounds are heard using long Blue tube No. 1, the bag-valve device must be switched to the shorter Clear tube No. 2. If epigastric sounds are still heard, the Combitube® must be withdrawn and correct placement may be reattempted. If no epigastric sounds are heard, proceed to **auscultation of the thorax bilaterally.** Breath sounds are best auscultated in the anterior to mid axillary lines.

3. **Assessment of physiologic changes.** These include equal rise and fall of the chest, condensation in the Combitube® on exhalation, improvement in the patient's color, and improvement in the patient's respiratory distress or failure.

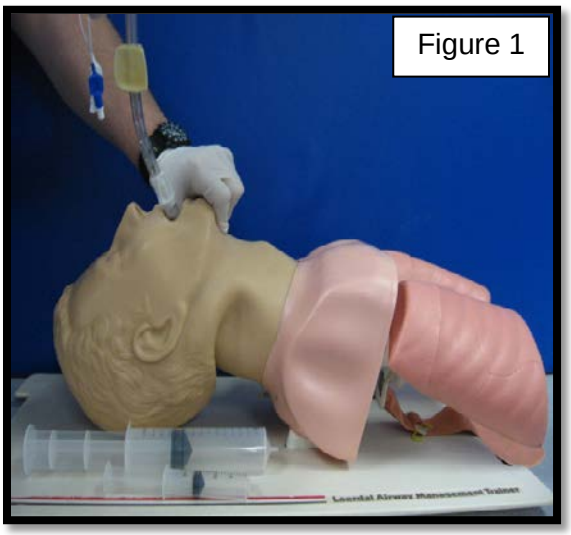
4. **Securing the Combitube® and placement of a cervical collar.**

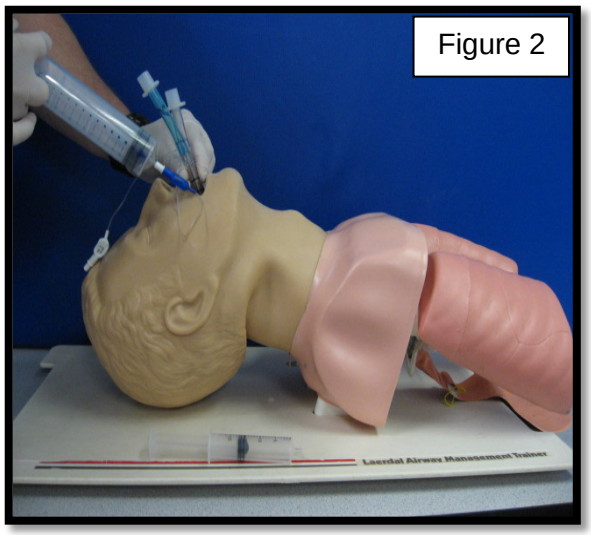
When Combitube® patients are moved during EMS care, the capnograph must be rechecked for any change. If the waveform continues to show a normal pattern of rapid upstroke with exhalation, exhalation plateau, and rapid downstroke with inhalation, no further repeat confirmation is required. If at any time, the capnograph waveform is abnormal, steps 1-4 must be rechecked and documented. If at any time during patient care there is doubt as to correct Combitube® placement, you must either reverify by this sequence or reattempt correct Combitube® placement. While the Combitube® placer may delegate confirmation steps to his/her colleagues, he or she is ultimately responsible to ensure that a complete confirmation sequence is performed. If the Combitube® placer accompanies the patient to the hospital, he or she remains ultimately responsible for ongoing Combitube® placement confirmation. If the Combitube® placer does not accompany the patient to the hospital by ambulance or helicopter ambulance transport, the primary transporting/treating paramedic or RN assumes ultimate responsibility for ongoing Combitube® tube placement confirmation.

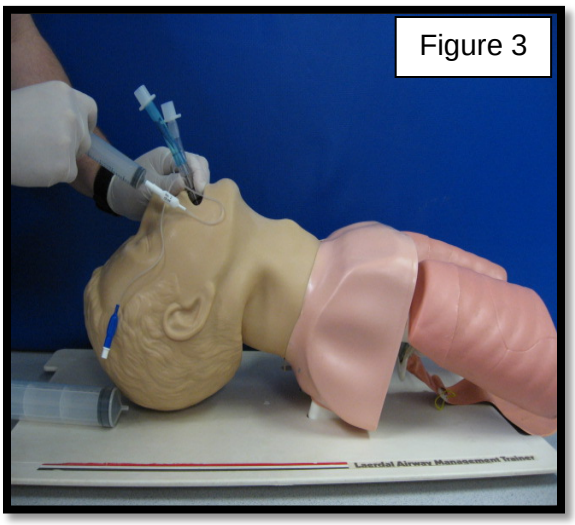
Do NOT remove a properly functioning Combitube® unless the patient's gag reflex returns. Do NOT remove a properly functioning Combitube® to attempt endotracheal intubation.

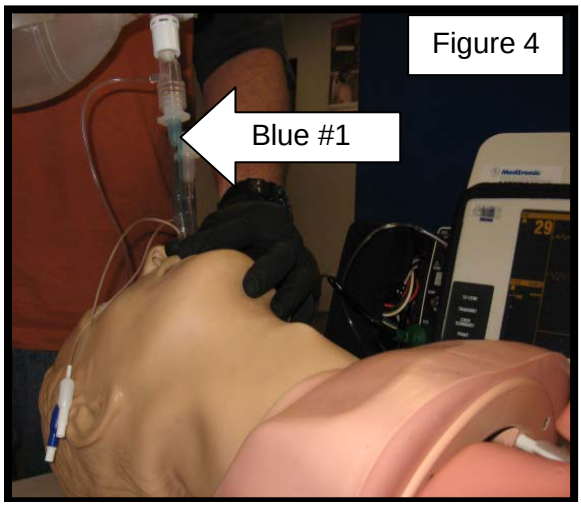
Special Note:
This protocol details the proper use of the Combitube® to illustrate one method of establishing an invasive airway. The Oklahoma Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the Combitube® for invasive airway use by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in establishing and maintaining an invasive airway if not using the Combitube®.

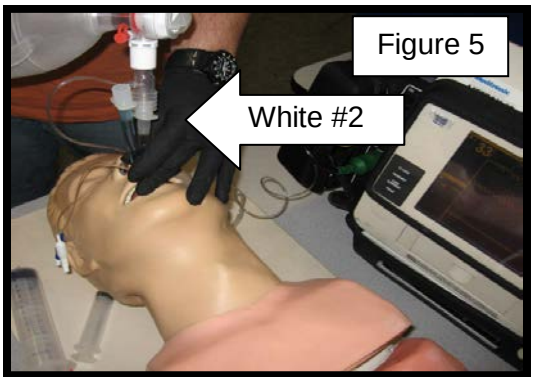
PROTOCOL 2F: Combitube® Airway – Adult, cont.











Medical Literature References
2F – Combitube® Airway – Adult

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2G – ORAL INTUBATION ADULT

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

Indications:

1. Hypoxia and/or hypoventilation refractory to non-invasive airway/respiratory management.
2. Airway protection to minimize aspiration in the setting of sustained altered mental status with a Glasgow Coma Scale Score <8.
3. Impending airway edema in the setting of respiratory tract burns or anaphylaxis.

Contraindications:

1. Three unsuccessful oral and/or nasal intubation attempts in the above settings. An intubation attempt has occurred when the tip of the endotracheal tube is advanced beyond the gum line or into a nare. Attempts are counted per patient not per intubator.
2. Waveform capnography not immediately available.

Technique:

1. Walk the laryngoscope down the tongue to avoid placing the laryngoscope in the esophagus.

2. If unable to lift the mandible with the laryngoscope, place your left forearm on the pt's head for leverage.

3. If the vocal cords are poorly visualized in any patient, manipulate the thyroid cartilage with your right hand until appropriate visualization is achieved. Have a colleague hold the thyroid cartilage in this place while you finish intubating. This technique is referred to as "bimanual laryngoscopy" and works much more reliably than cricoid pressure.

4. If the vocal cords are still poorly visualized in obese patients without suspected spinal injury, elevate their head/neck/shoulders. Place blankets or pillows under the head/neck/shoulders until the patient's chin or nose is level with the chest.

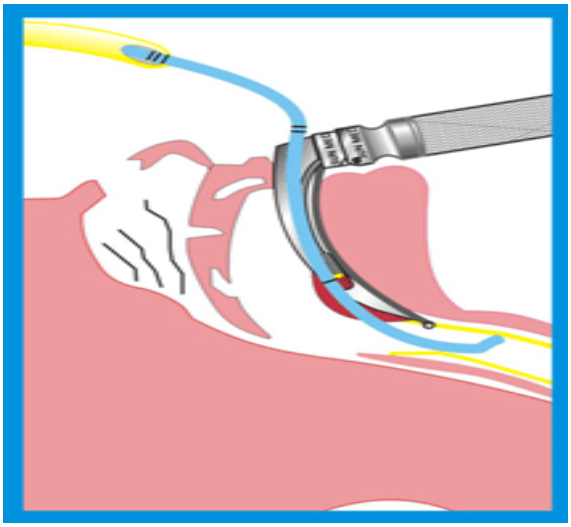
5. If ambient light inhibits visualization of the larynx, block this light by any means possible, including a blanket stretched over your head and the patient's head and neck.

6. In adult patients of appropriate size, strong preference is given for using the 8.0 mm endotracheal tube for orotracheal intubation. Use of this sized tube enables inpatient pulmonary care unable to be performed with smaller sized tubes.

PROTOCOL 2G: Oral Intubation – Adult, cont.

The Flex-Guide™ Introducer (also known as the Gum Elastic Bougie – see Special Note):

The Flex-Guide™ Introducer is a single patient use, semi-rigid plastic rod with an angled tip, promoting glottic passage when the vocal cords are incompletely visible during laryngoscopy. A 1 cm wide black band is located along the Flex-Guide™ to help determine correct placement depth. The Flex-Guide™shape and elasticity allow the intubator to feel a “washboard” sensation as the anteriorly-angled tip is advanced down the tracheal rings. Failure to feel a "washboard" sensation indicates inadvertent esophageal placement and the Flex-Guide™ must be fully withdrawn before reattempting placement. The Flex-Guide™ length allows it to be advanced to the carina where resistance is met, also a means of confirming tracheal rather than esophageal placement. Avoid storing the Flex-Guide™ coiled, as it works best in these regards when it is straight. The Flex-Guide™ is contraindicated in patients ≤ 16 years of age.



Flex-Guide™ Introducer Technique:

1. Advance the angled tip facing anteriorly, with continual visualization by laryngoscopy. Anytime resistance is met, stop advancing and reassess placement - forceful passage can result in perforation of soft tissues.

2. Stabilize the Flex-Guide™ when in place, while maintaining laryngoscopy

3. Direct a colleague to slide the endotracheal tube over the Flex-Guide™. He or she stabilizes the proximal end of the Flex-Guide™ as it emerges from the sliding endotracheal tube.

4. Take control of the endotracheal tube, sliding it down the Flex-Guide™ length, while being careful to avoid Flex-Guide™ migration. Once the endotracheal tube has passed to an appropriate estimated endotracheal depth, stabilize it while your colleague withdraws the Flex-Guide™ prior to laryngoscope removal.

PROTOCOL 2G: Oral Intubation – Adult, cont.

Confirmation of Oral Endotracheal Placement:

The following sequence is to be used (and its use documented) to verify and maintain correct oral endotracheal placement without fail:

1. **Visualization of endotracheal tube passage between the vocal cords.**

2. **Detection ofEnd-tidal carbon dioxide.**End-tidal carbon dioxide ($EtC0_2$) detection shall be confirmed within 60 seconds of endotracheal tube placement. The capnography adaptor is to be placed at the bag-valve device-endotracheal tube interface for the first ventilation.The normal waveform indicating correct endotracheal placement reflects a rapid upstroke with the beginning of exhalation, the exhalation plateau ending at the point of $EtC0_2$ measurement,and a rapid downstroke with the beginning of inhalation. Any waveform that does not show rhythmic rise and fall correlating with assisted ventilations indicates incorrect tube placement and the tube must be withdrawn. **To be perfectly clear, the use of an endotracheal tube for ongoing oxygenation and ventilation is dependent upon continuously measurable capnography waveforms**. See Protocol 3H-Capnography for discussion of $EtCO_2$ values.

3. **Auscultation. Auscultate the epigastrum.** If epigastric sounds are heard, intubation is to be reattempted. The endotracheal tube placed in the esophagus may be left in place, at the intubator'sdiscretion, until another endotracheal tube is correctly placed and verified. If no epigastric soundsare heard, proceed to **auscultation of the thorax bilaterally.** Breath sounds are best auscultatedin the anterior to mid axillary lines. If breath sounds are present on the right and absent on the left,this suggests a right main stem intubation. Withdraw the endotracheal tube 1cm and repeat breathsound auscultation. If necessary, the tube may be withdrawn an additional 1-2cm.

4. **Assessment ofphysiologic changes.** These include equal rise and fall of the chest, condensation in the endotracheal tube on exhalation, improvement in the patient's color, and improvement in the patient's respiratory distress or failure.

5. **Securing the endotracheal tube with a tube holder and placement of a cervicalcollar.**

   When intubated patients are moved during EMS care, waveform capnography must be rechecked forany change. If the waveform continues to show a normal pattern of rapid upstroke with exhalation, exhalation plateau, and rapid downstroke with inhalation, no further repeat confirmation is required. If at any time, the capnographywaveform is abnormal, steps 2-5 must be rechecked and documented. If at any time during patient care there is doubt as to correct endotracheal placement of intubation, you must either re-verify by this sequence or reattempt correct endotracheal placement. While the intubator may delegate confirmation steps to his/her colleagues, he or she is ultimately responsible to ensure that a complete confirmation sequence is performed. If the intubator accompanies the patient to the hospital, he or she remains ultimately responsible for ongoing endotracheal tube placement confirmation. If the intubator does not accompany the patient to the hospital by ambulance or helicopter ambulancetransport, the primary transporting/treating paramedic or RN assumes ultimate responsibility for ongoing endotracheal tube placement confirmation.

PROTOCOL 2G: Oral Intubation – Adult, cont.

Special Note:

This protocol details the proper use of the Flex-Guide™ to illustrate one method of assisting the establishment of orotracheal intubation. The Oklahoma Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the Flex-Guide™for invasive airway use by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in establishing orotracheal intubation if not using the Flex-Guide™.

Medical Literature References
2G – Oral Intubation – Adult

1. Davis DP, Koprowicz KM, Newgard CD, Daya M, Bulger EM, Stiell I, Nichol G, Stephens S, Dreyer J, Minei J, Kerby JD. The relationship between out-of-hospital airway management and outcome among trauma patients with Glasgow Coma Scale Scores of 8 or less. Prehosp Emerg Care. 2011 Apr-Jun;15(2):184-92.
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11. Silvestri S, Ralls GA, Krauss B, Thundiyil J, Rothrock SG, Senn A, Carter E, Falk J. The effectiveness of out-of-hospital use of continuous end-tidal carbon dioxide monitoring on the rate of unrecognized misplaced intubation within a regional emergency medical services system. Ann Emerg Med. 2005 May;45(5):497-503.
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2H - MEDICATION ASSISTED INTUBATION ADULT

TREATMENT PRIORITIES

1, Oxygenation/Ventilation support

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

PARAMEDIC

MEDICATION-ASSISTED INTUBATION IF INDICATED
FOLLOW PROTOCOL 2G – ORAL INTUBATION FOR TECHNIQUE & CONFIRMATION OF INTUBATION

FOR FACILITATING ORAL INTUBATION:
ADULT: ETOMIDATE 0.3 mg/kg IVP/IOP SINGLE DOSE
OR
ADULT: MIDAZOLAM 0.1 mg/kg TO MAX OF 5 mg IVP/IOP
MAY REPEAT ONCE IF ADULT SYS BP ≥ 100 mmHg

FOR POST-ORAL INTUBATION SEDATION TO PREVENT EXTUBATION (IF INDICATED):
ADULT: MIDAZOLAM 0.1 mg/kg TO MAX OF 5 mg IVP/IOP
MAY REPEAT ONCE IF ADULT SYS BP ≥ 100 mmHg
OR
ADULT: DIAZEPAM 0.1 mg/kg TO MAX OF 5 mg IVP/IOP
MAY REPEAT ONCE IF ADULT SYS BP ≥ 100 mmHg
OR
ADULT: LORAZEPAM 0.1 mg/kg TO MAX OF 2 mg IVP/IOP
MAY REPEAT ONCE IF ADULT SYS BP ≥ 100 mmHg

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
2H–Medication Assisted Intubation – Adult

1. Banh KV, James S, Hendey GW, Snowden B, Kaups K. Single-Dose Etomidate for Intubation in the Trauma Patient. J Emerg Med. 2012 May 2. [Epub ahead of print]
2. Dmello D, Taylor S, O'Brien J, Matuschak GM. Outcomes of etomidate in severe sepsis and septic shock. Chest. 2010 Dec;138(6):1327-32.
3. Tekwani KL, Watts HF, Sweis RT, Rzechula KH, Kulstad EB. A comparison of the effects of etomidate and midazolam on hospital length of stay in patients with suspected sepsis: a prospective, randomized study. Ann Emerg Med. 2010 Nov;56(5):481-9. Epub 2010 Sep 15.
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19. Dickinson ET, Cohen JE, Mechem CC.The effectiveness of midazolam as a single pharmacologic agent to facilitate endotracheal intubation by paramedics.PrehospEmerg Care. 1999 Jul-Sep;3(3):191-3.
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2I – NASAL INTUBATION ADULT

EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:

1. Hypoxia and/or hypoventilation refractory to non-invasive airway/respiratory management.
2. Airway protection to minimize aspiration in the setting of sustained altered mental status with a Glasgow Coma Scale Score <8.
3. Impending airway edema in the setting of respiratory tract burns or anaphylaxis.
4. Patients more compliant with intubation attempts in a sitting position.
5. Oral anatomy, injury, or jaw clenching preventing indicated orotracheal intubation.

Contraindications:

1. Apnea.
2. Pediatric patients (age ≤12 years).
3. Suspected basilar skull fracture.
4. Mid-facial injuries with bony instability.
5. Combativeness preventing patient compliance.
6. Anticoagulant use (Warfarin/Coumadin, Plavix, or Aspirin) - Relative contraindication - orotracheal intubation preferred to minimize bleeding complications
7. Three unsuccessful oral and/or nasal intubation attempts in the above settings. An intubation attempt has occurred when the tip of the endotracheal tube is advanced beyond the gum line or into a nare. Attempts are counted per patient not per intubator.
8. Waveform capnography not immediately available.

Technique:

1. Apply two sprays of phenylephrine 2% in each nare to induce local vasoconstriction. This will enlarge the nares and decrease epistaxis complications.

2. Apply lidocaine 2% gel to the endotracheal tube cuff.

3. Insert the well-lubricated tube along the floor of the most patent nare, bevel sidefacing inward toward the septum. This positioning will prevent a turbinate from being trapped in the tube and subsequently being sheared off as the tube is advanced. Pass the tube straight back (not angulated upward) with constant, gentle pressure. Do not use an endotracheal stylet in nasotracheal intubations.

4. As the tube is advanced, there is a loss of resistance as the tube passes from the nasopharynx into the oropharynx. Continue advancing the tube.

PROTOCOL 2I: Nasal Intubation – Adult, cont.

5. As the tube nears the glottis, guide the tube by listening at the adaptor. The awake patient should be instructed to deeply inspire to help guide the tube through the vocal cords and into the trachea. Correct endotracheal placement may also be assisted by rotating the tube 90 degrees so that the bevel is up and facing the glottis.

6. Once the tube has been placed, the patient should not be capable of phonation. The ability to speak after "nasotracheal intubation" actually denotes "nasoesophageal intubation." In such cases, the tube is to be slightly withdrawn and correct placement reattempted. The Flex-Guide™ may NOT be used for difficult nasotracheal intubations.

Confirmation of Nasal Endotracheal Placement:

The following sequence is to be used (and its use documented) to verify and maintain correct nasal endotracheal placement without fail:

1. **Detection ofEnd-tidal carbon dioxide.** End-tidal carbon dioxide ($EtC0_2$) detection shall be confirmed within 60 seconds of endotracheal tube placement. The capnography adaptor is to be placed at the bag-valve device-endotracheal tube interface for the first ventilation. The normal waveform indicating correct endotracheal placement reflects a rapid upstroke with the beginning of exhalation, the exhalation plateau ending at the point of $EtC0_2$ measurement, and a rapid downstroke with the beginning of inhalation. Any waveform that does not show rhythmic rise and fall correlating with assisted ventilations indicates incorrect tube placement and the tube must be withdrawn. **To be perfectly clear, the use of an endotracheal tube for ongoing oxygenation and ventilation is dependent upon continuously measurable capnography waveforms**. See Protocol 3H -Capnography for discussion of $EtCO_2$ values.

2. **Auscultation. Auscultate the epigastrum.** If epigastric sounds are heard, intubation is to be reattempted. If no epigastric sounds are heard, proceed to **auscultation of the thorax bilaterally.** Breath sounds are best auscultated in the anterior to mid axillary lines. If breath sounds are present on the right and absent on the left, this suggests a right main stem intubation. Withdraw the endotracheal tube 1cm and repeat breath sound auscultation. If necessary, the tube may be withdrawn an additional 1-2cm.

3. **Assessment of physiologic changes.** These include equal rise and fall of the chest, condensation in the endotracheal tube on exhalation, improvement in the patient's color, and improvement in the patient's respiratory distress or failure.

4. **Securing the endotracheal tube with tape and placement of a cervical collar.**

   When intubated patients are moved during EMS care, waveform capnography must be rechecked for any change. If the waveform continues to show a normal pattern of rapid upstroke with exhalation, exhalation plateau, and rapid downstroke with inhalation, no further repeat confirmation is required. If at any time, the capnography waveform is abnormal, steps 1-4 must be rechecked and documented. If at any time during patient care there is doubt as to correct endotracheal placement of intubation, you must either reverify by this sequence or reattempt correct endotracheal placement. While the intubator may delegate

PROTOCOL 2I: Nasotracheal Intubation – Adult, cont.

Confirmation of Nasal Endotracheal Placement (cont.):

confirmation steps to his/her colleagues, he or she is ultimately responsible to ensure that a complete confirmation sequence is performed. If the intubator accompanies the patient to the hospital, he or she remains ultimately responsible for ongoing endotracheal tube placement confirmation. If the intubator does not accompany the patient to the hospital by ambulance or helicopter ambulance transport, the primary transporting/treating paramedic or RN assumes ultimate responsibility for ongoing endotracheal tube placement confirmation.

Medical Literature References
2I – Nasal Intubation – Adult

1. Davis DP, Koprowicz KM, Newgard CD, Daya M, Bulger EM, Stiell I, Nichol G, Stephens S, Dreyer J, Minei J, Kerby JD. The relationship between out-of-hospital airway management and outcome among trauma patients with Glasgow Coma Scale Scores of 8 or less. PrehospEmerg Care. 2011 Apr-Jun;15(2):184-92.
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2J – CRICOTHYROTOMY ADULT

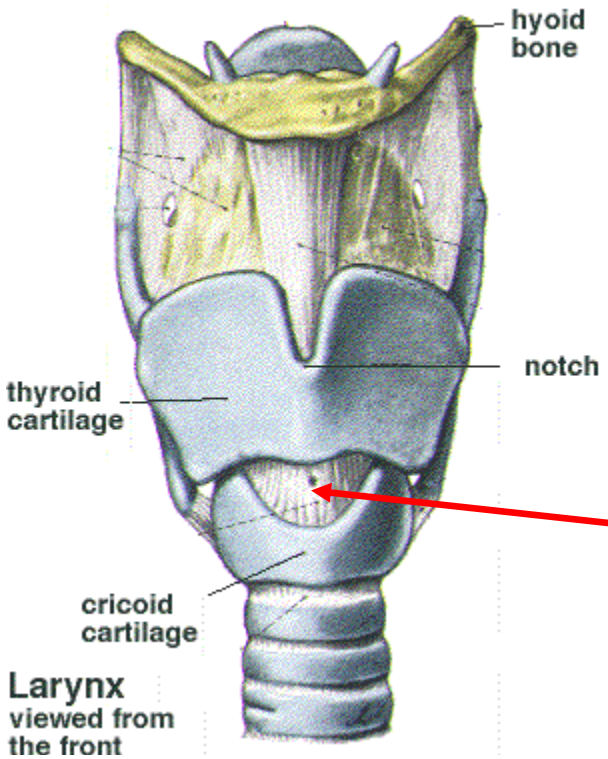
PARAMEDIC

Indications:

1. Upper airway obstruction (eg. facial or neck trauma occluding airway patency, foreign body unable to be removed, angioedema) and inability to adequately oxygenate and ventilate using less invasive methods.

Contraindications:

1. Ability to oxygenate and ventilate using less invasive methods.
2. Infant and younger pediatrics – airway anatomical size not conducive to successful cricothyrotomy in EMS care. Contact OLMC for direction in these ages.
3. Older pediatrics – airway anatomical size MAY not be conductive to successful cricothyrotomy in EMS care. Contact OLMC for direction in these ages.
4. Suspected fractured larynx and/or cricoid cartilage.
5. Suspected tracheal transaction with retraction of the trachea into the chest.
6. Inability to find anatomical landmarks



Do not confuse the hyoid bone for the thyroid cartilage.

Attempted placement of a cricothyrotomy airway superior to the thyroid cartilage will cause anatomical disruption and will NOT establish a secure airway capable of needed oxygenation and ventilation. The hyoid bone does NOT have the distinct notch of the thyroid cartilage.

Cricothyroid membrane

PROTOCOL 2J: Emergency Cricothyrotomy – Adult, cont.

Surgical Technique (6.0 endotracheal tube and tracheal hook):

A. Establish adequate space and lighting. Do not attempt cricothyrotomy in poorly visualized conditions.

B. If rapidly available, clean anterior neck with ChloraPrep®, Betadine®, or alcohol wipe.

C. Definitively locate the following landmarks: thyroid cartilage ("Adam's apple") and cricoid cartilage. The cricothyroid membrane lies between these cartilages.

D. Using the non-dominant hand, spread the overlying skin taut with the thumb and fingers, and slightly depress the skin over the cricothyroid membrane with the index finger to mark the site of cricothyrotomy. Do not release the non-dominant hand from the neck until the procedure is complete! Once the anatomy is found and defined, avoid movement of the anatomy to promote proper cricothyrotomy airway placement.

E. Stabilization of the anatomy requires assistance from a second EMS professional, preferably licensed as a paramedic as well.

F. Ask second EMS professional to aspirate all air from the endotracheal tube cuff.

G. Using a sterile scalpel, make a vertical incision in the mid-line of the neck extending from just above the lower edge of the thyroid cartilage to the middle of the cricoid cartilage. Make the depth of this incision sufficient to extend through the skin and fatty tissue underneath.

H. Using sterile hemostats, spread the incision open horizontally to expose the cricothyroid membrane. Instruct the second EMS professional to hold the hemostats in this position.

I. Using the same scalpel as in Step G, now make a short horizontal incision in the middle of the cricothyroid membrane. There is a small artery running vertically on each side of the cricothyroid membrane. Keeping the horizontal incision less than ½ inch (approx. 1 cm) will decrease bleeding that may occur.

J. Pass the 6.0 mm endotracheal tube through the horizontal incision in the cricothyroid membrane, angling the tube inferior and posterior along the tracheal anatomy. A "washboard" sensation may be felt as the tube slides along the tracheal wall. Avoid excessive pressure in placing the endotracheal tube, but a moderate degree may be required to first pass the endotracheal tube through the cricothyroid membrane. If significant resistance is encountered (without suspicion of lower respiratory tract foreign body), the hemostats used in Step H may be used to spread the cricothyroid membrane incision vertically while the endotracheal tube is passed through it and/or use of the tracheal hook may better stabilize the anatomy to overcome resistance to airway passage.

PROTOCOL 2J: Emergency Cricothyrotomy – Adult, cont.

Surgical Technique, cont.:

K. Inflate the endotracheal cuff and verify airway placement per Protocol 2K – Confirmation of Artificial Airway Placement.

L. Secure the airway using a cloth tie or commercial endotracheal tube restraint while continuing oxygenation and ventilation. Artificial ventilation will generally be easier if the endotracheal tube is cut to a shorter length. Be careful to cut the upper aspect of the endotracheal tube above the insertion site of the cuff inflation portal to avoid irreversible cuff deflation.

Non-Surgical Technique (PerTrach® Kit and tracheal hook – see protocol Special Note):

A. Establish adequate space and lighting. Do not attempt cricothyrotomy in poorly visualized conditions.

B. If rapidly available, clean anterior neck with ChloraPrep®, Betadine®, or alcohol wipe.

C. Definitively locate the following landmarks: thyroid cartilage ("Adam's apple") and cricoid cartilage. The cricothyroid membraine lies between these cartilages in the neck midline.

D. Using the non-dominant hand, spread the overlying skin taut with the thumb and fingers, and slightly depress the skin over the cricothyroid membrane with the index finger to mark the site of cricothyrotomy. Do not release the non-dominant hand from the neck until the procedure is complete! Once the anatomy is found and defined, avoid movement of the anatomy to promote proper cricothyrotomy airway placement.

E. Stabilization of the anatomy requires assistance from a second EMS professional, preferably licensed as a paramedic as well.

F. Ask second EMS professional to aspirate all air from the tracheostomy tube cuff.

G. Using the dominant hand on the break-away needle and syringe, puncture in the lower half of the cricothyroid membrane, mid-line, at a 45 degree angle towards the chest (following the path of the airway from superior to inferior). Once air is aspirated in the syringe, advance another few millimeters in depth and remove the syringe.

H. Using the included small scalpel, make a single vertical "stab" incision immediately to one side of the needle.

PROTOCOL 2J: Emergency Cricothyrotomy – Adult, cont.

Non-Surgical Technique, cont.

I. Place a tracheal hook in the incision and position the hook to pull anterior and superior on the inferior border of the thyroid cartilage. Exercise caution when manipulating the tracheal hook into the incision – the tip of most tracheal hooks is particularly sharp-edged.

J. The second EMS professional should now control the tracheal hook.

K. Palming the airway and dilator stylet, advance through the needle until resistance is met. The second EMS professional should split the needle by compressing and widening the "butterfly" tips on the needle and then remove each side of the needle. Constant inward/downward pressure on the airway and stylet must be maintained to avoid inadvertent displacement of the airway and ensure the tip of the airway will remain in the trachea.

L. Continue to advance the airway/stylet until the airway is fully in the trachea (airway passed to hub contact with overlying skin) and remove the tracheal hook.

M. Inflate the airway cuff and verify airway placement per Protocol 2K – Confirmation of Artificial Airway Placement.

N. Secure the airway using the cloth tie while continuing oxygenation and ventilation.

Modified Non-Surgical Technique (PerTrach® Kit – see protocol Special Note):

In patients with neck edema, subcutaneous air, or fat/obesity preventing necessary tactile identification of anatomical landmarks to perform standard non-surgical cricothyrotomy, utilize the following modification:

A. Using the included small scalpel, make a single, vertical, mid-line incision in the skin overlying the area that is estimated to contain the thyroid cartilage, cricothyroid membrane, and cricoid cartilage. When making the incision, make an incision approximately 2 inches (5 cm) in length and deep enough that the subcutaneous fat can be visualized. Using a gloved index finger palpate the structures through the incision and when identified, proceed as per standard non-surgical cricothyrotomy.

Special Note:

This protocol utilizes the PerTrach®Kit to describe one method of performing a non-surgical cricothyrotomy. The Oklahoma Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the PerTrach®Kit for non-surgical cricothyrotomy by Paramedics. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in establishing and maintaining non-surgical cricothyrotomy if not using the PerTrach®Kit.

Medical Literature References
2J- Cricothyrotomy– Adult

1. Mabry RL. An analysis of battlefield cricothyrotomy in iraq and afghanistan. J Spec Oper Med. 2012 Spring;12(1):17-23.
2. Hubble MW, Wilfong DA, Brown LH, Hertelendy A, Benner RW. A meta-analysis of prehospital airway control techniques part II: alternative airway devices and cricothyrotomy success rates. PrehospEmerg Care. 2010 Oct-Dec;14(4):515-30.
3. Keane MF, Brinsfield KH, Dyer KS, Roy S, White D. A laboratory comparison of emergency percutaneous and surgical cricothyrotomy by prehospital personnel. PrehospEmerg Care. 2004 Oct-Dec;8(4):424-6.
4. Marcolini EG, Burton JH, Bradshaw JR, Baumann MR. A standing-order protocol for cricothyrotomy in prehospital emergency patients. PrehospEmerg Care. 2004 Jan-Mar;8(1):23-8.
5. Fortune JB, Judkins DG, Scanzaroli D, McLeod KB, Johnson SB. Efficacy of prehospital surgical cricothyrotomy in trauma patients. J Trauma. 1997 May;42(5):832-6.

2K – CONFIRMATION OF ENDOTRACHEAL ARTIFICIAL AIRWAY PLACEMENT ADULT

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

The following sequence is to be used (and its use documented) to verify and maintain correct endotrachealartificial airway placement without fail:

1. **Visualization of endotracheal tube passage between vocal cords – oral intubation only.** (Figure 1)

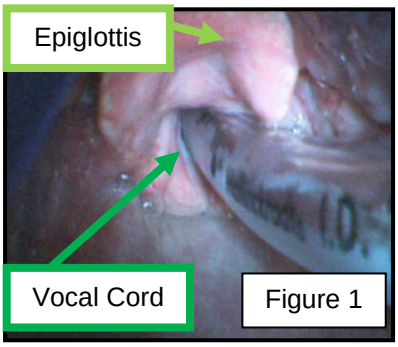


Figure 1

2. **Detection ofEnd-tidal carbon dioxide.** End-tidal carbon dioxide ($EtC0_2$) detection shall be confirmed within 60 seconds of endotracheal tube placement. The capnography adaptor is to be placed at the bag-valve device-endotracheal tube interface for the first ventilation. The normal waveform indicating correct endotracheal placement reflects a rapid upstroke with the beginning of exhalation, the exhalation plateau ending at the point of $EtC0_2$ measurement, and a rapid downstroke with the beginning of inhalation. Any waveform that does not show rhythmic rise and fall correlating with assisted ventilations indicates incorrect tube placement and the tube must be withdrawn. **To be perfectly clear, the use of an endotracheal tube for ongoing oxygenation and ventilation is dependent upon continuously measurable capnography waveforms**. See Protocol 3H -Capnography for discussion of $EtCO_2$ values and waveforms. (Figure 2)

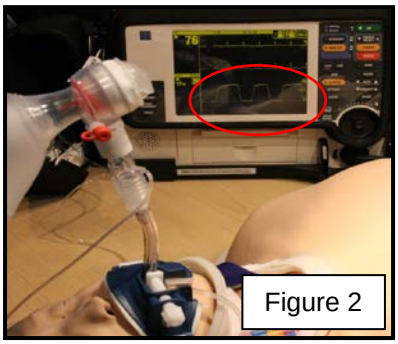


Figure 2

3. **Auscultation.Auscultate the epigastrium.** (Figure 3) If epigastric sounds are heard, intubation is to be reattempted.The endotracheal tube placed in the esophagus maybe left in place, at the intubator's discretion, until another endotracheal tube is correctly placed and verified. If no epigastric sounds are heard, proceed to **auscultation of the thoraxbilaterally**. Breath sounds are best auscultated in the anterior to mid-axillary lines. If breath sounds are present on the right and absent onthe left, this suggests a right mainstem intubation. Withdraw the endotracheal tube 1cm and repeat breath sound auscultation. If necessary, the tube may be withdrawn an additional 1-2cm.

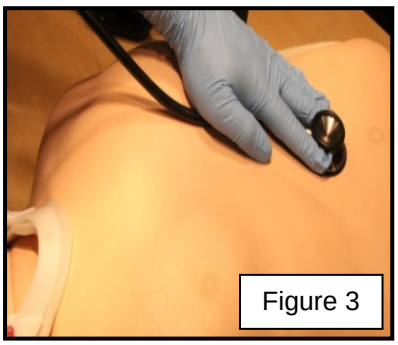


Figure 3

PROTOCOL 2K: Confirmation of Endotracheal Artificial Airway Placement – Adult

4. **Assessment of physiologic changes.** These include equal rise and fall of the chest,condensation in the endotracheal tube on exhalation, improvement in the patient's color, andimprovement in the patient's respiratory distress/failure.

5. **Securing the endotracheal tube with a tube holder and placement of a cervical collar.** (Figure 4)

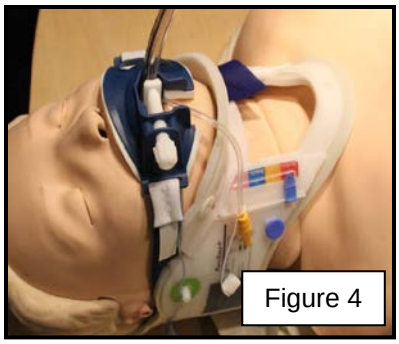


Figure 4

When intubated patients are moved during EMS care, waveform capnography must be rechecked for any change. If the waveform continues to show a normal pattern of rapid upstroke with exhalation, exhalation plateau, and rapid downstroke with inhalation, no further repeat confirmation is required. If at any time, the capnography waveform is abnormal, steps 2-5 must be rechecked and documented. If at any time during patient care there is doubt as to correct endotracheal placement of intubation, either re-verify by this sequence or reattempt correct endotracheal placement. While the intubator may delegate confirmation steps to his/her colleagues, he or she is ultimately responsible to ensure that acomplete confirmation sequenceis performed. If the intubator accompanies the patient to the hospital, he or she remains ultimately responsible for ongoing endotracheal tube placement confirmation. If the intubator does not accompany the patient to the hospital by ambulance or helicopter ambulance transport, the primary transporting/treating paramedic or RN assumes ultimate responsibility for ongoing endotracheal tube placement confirmation.

Special Note:

This protocol utilizes commercially produced devices in illustrations of an endotracheal tube, waveform capnography shown on a monitor/defibrillator, and an endotracheal tube being held in place with a motion restriction device attached to the endotracheal tube and a cervical collar. The Oklahoma Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the commercially produced devices in these illustrations for use by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in following the steps of confirmation of endotracheal artificial airway placement if not using these specific devices.

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2L – STOMA/TRACHEOSTOMY MANAGEMENT ADULT & PEDIATRIC

EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Emergency Management:

- The majority of adults and children with tracheostomies are dependent on the tube as their primary airway. Cardio-respiratory arrest most commonly results from tracheostomy obstructions. Obstruction may be due to thick secretions/mucous plug, blood clot, foreign body, or kinking or dislodgement of the tube. Work expeditiously and deliberately to re-establish airway patency and support oxygenation/ventilation.
- Early warning signs of obstruction include tachypnea, tachycardia, and desaturation. Cyanosis, bradycardia and apnea are late signs - do not wait for these to develop before intervening.

Complications:

- Airway obstruction
- Aspiration
- Blocked tube
- Bleeding
- Tracheal trauma
- Pneumothorax
- Subcutaneous and mediastinal emphysema
- Respiratory and cardiovascular collapse
- Dislodged tube
- Tracheo-esophageal fistula
- Infection

Endotracheal Suctioning:

Endotracheal suctioning is necessary to remove mucus, maintain a patent airway, and avoid tracheostomy tube blockages. Indications for suctioning include:

- Audible or visual signs of secretions in the tube
- Signs of respiratory distress
- Suspicion of blocked or partially blocked tube
- Inability to clear the tube by coughing out the secretions
- Increases in required ventilation pressures (in ventilated patients)
- Request by patient for suction

PROTOCOL 2L: Stoma/Tracheostomy Management– Adult & Pediatric, cont.

Endotracheal Suctioning, cont.:

- Tracheal suctioning should be carried out regularly for patients with a tracheostomy. The frequency varies between patients and is based on individual assessment.
- Tracheal damage may be caused by suctioning. This can be minimized by using the appropriate sized suction catheter and only suctioning within the tracheostomy tube.

Table 1: recommended suction catheter sizes

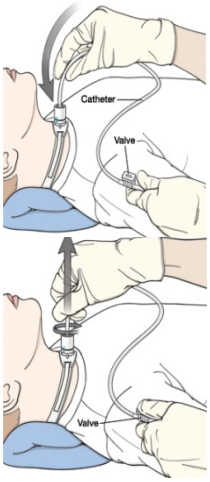
Tracheostomy tube size (in mm)	3.0 mm	3.5 mm	4.0 mm	4.5 mm	5.0 mm	6.0mm	7.0mm	7.5mm	8.0mm	9.0mm – 10mm
Recommended suction catheter size (Fr)	7	8	8	10	10	10-12	14	14-16	14-16	16

- The suction depth is determined by the estimated length of the tracheostomy tube.
- The depth of insertion of the suction catheter needs to be determined prior to suctioning to avoid trauma.
- Using the patient's spare tracheostomy tube of the same size (if available) to estimate needed depth of suctioning.
- The pressure setting for tracheal suctioning (suction machine pressure for small children 50-100mmHg, for older children/adults 100-120mmHg) to avoid tracheal damage.
- In most circumstances, it is best to limit the duration of suctioning (including passing the catheter and suctioning the tracheostomy tube) to 5-10 seconds.
- Routine use of normal saline is not necessary although there is anecdotal evidence it may thin secretions. In situations where this may be of benefit, only 1-2 mL is usually needed.

PROTOCOL 2L: Stoma/Tracheostomy Management– Adult & Pediatric, cont.

Tracheal Suctioning Procedure:

1. Inform pt of intended action.
2. Maintain appropriate PPE throughout procedure.
3. Assemble needed suction equipment and power on suction device.
4. Instill small volume of sterile normal saline into the tracheostomy tube if needed for thick or dry secretions. Excessive use of saline is not recommended. Use saline only if the mucus is very thick, hard to cough up or difficult to suction. Recommended amount per instillation is approximately 1-2mL.
5. Gently insert catheter into the tracheal tube without applying suction, passing to the previously estimated needed depth.
6. Put thumb over opening in catheter to create suction and use a circular motion (twirl catheter between thumb and index finger) while withdrawing the catheter so that the mucus is removed well from all areas. Avoid suctioning longer than 10 seconds because of oxygen loss. Suction normal saline from a container if needed to clear catheter.
7. For tracheostomy tubes with cuffs, it may be necessary to deflate the cuff periodically for suctioning to prevent pooling of secretions above tracheal cuff.
8. Let patient rest and breathe, then repeat suction if needed until clear (trying to allow about 30 seconds between suctioning).
9. Oxygenate/ventilate as needed.



Tracheostomy tube tie changes:

- There is a potential risk for tracheostomy tube dislodgment when attending to tie changes, therefore two personnel who are competent in tracheostomy care should undertake tracheostomy tie changes.
- During the tracheostomy tie change one person is to maintain the airway by securing the tracheostomy tube in place and not removing the hand until the new tracheostomy ties are applied. The other person is to change the ties and attend to stoma care.
- If the tie becomes loose, make it is a priority to re-secure the tracheostomy tube before it can become dislodged.

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2L - Stoma/Tracheostomy Management– Adult & Pediatric

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SECTION 3

PULMONARY / RESPIRATORY

3A – RESPIRATORY ARREST ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Airway patency
2. Oxygenation/Ventilation
3. Vital signs
4. Dextrose for hypoglycemia
5. Naloxone for narcotic/opiate overdose

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

CPR BY EMD INSTRUCTION

EMR / EMT

ESTABLISH AIRWAY PATENCY (POSITIONING, OPA, NPA)
O_2 VIA BVM AS APPROPRIATE
GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
DETERMINE BLOOD GLUCOSE
APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (if equipped)
TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT

EMT OR HIGHER LICENSE:
MEASURE END–TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, **Mandatory use if pt intubated)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED
DO NOT INTUBATE PATIENTS WITH RAPIDLY REVERSIBLE RESP ARREST ETIOLOGY (e.g. NARCOTIC/OPIATE OVERDOSE)

IV/IO ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 ML BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 liters NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

ADULT & PEDIATRIC WEIGHT ≥25 kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dl, D50 1 mL/kg IVP UP TO 50 mL
GLUCAGON 1 mg IM IF NO VASCULAR ACCESS OBTAINED
PEDIATRIC WEIGHT <25kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dl, D25 2 mL/kg IVP UP TO 50 mL
GLUCAGON 0.5 mg IM IF NO VASCULAR ACCESS OBTAINED
ADULT & PEDIATRIC: REPEAT DETERMINATION OF BLOOD GLUCOSE POST-DEXTROSE TREATMENT

ADVANCED EMT OR HIGHER LICENSE:
TOXINS/DRUG OVERDOSE – SUSPECTED NARCOTIC/OPIATE – APNEIC
ADULT: NALOXONE 2 mg IVP/IOP/IN MAY REPEAT ONCE
PEDIATRIC: NALOXONE 0.5 mg IVP/IOP/IN, MAY REPEAT TO MAX OF 2 mg

USE NALOXONE TO RESTORE EFFECTIVE BREATHING; AVOID EXCESSIVE DOSING TO PREVENT WITHDRAWAL

PARAMEDIC

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED

CONTINUOUS ASSESSMENT & TREATMENT OF SUSPECTED RESP ARREST ETIOLOGY PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
3A – Respiratory Arrest – Adult & Pediatric

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3B – DYSPNEA – UNCERTAIN ETIOLOGY ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Vital signs (including EtCO2, if equipped)
2. Oxygenation support
   - O_2 by NC, NRB
   - BVM, Bi/CPAP, ETT if indicated
3. Ventilation support
   - BVM, Bi/CPAP, ETT if indicated
4. Nebulization therapy
   - Albuterol

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
ADVISE PT SELF-ADMINISTRATION OF MEDICATIONS
(eg. ALBUTEROL INHALER)
IF PREVIOUSLY PRESCRIBED FOR SIMILAR SYMPTOMS

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR (if equipped)
ADULT: OBTAIN 12-LEAD ECG & TRANSMIT TO RECEIVING EMERGENCY DEPARTMENT (if equipped)
ASSIST PT WITH PT'S OWN ALBUTEROL INHALER/NEBULIZER (when applicable)

EMT OR HIGHER LICENSE:
MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped)
ADULT: APPLY Bi/CPAP IF INDICATED (if equipped)

ADULT & PEDIATRIC WEIGHT ≥15kg: NEBULIZED ALBUTEROL 5mg
PEDIATRIC WEIGHT <15kg: NEBULIZED ALBUTEROL 2.5mg
MAY REPEAT ALBUTEROL ENROUTE X 1 AS NEEDED

PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED
CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

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STATE OF OKLAHOMA
2013 EMERGENCY MEDICAL SERVICES PROTOCOLS

Oklahoma State Department of Health

Emergency Medicine University of Oklahoma

EMS DIVISION

3C – DYSPNEA – ASTHMA ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Vital signs (including EtCO2, if equipped)
2. Oxygenation support
   - O_2 by NC, NRB
   - BVM, Bi/CPAP, ETT if indicated
3. Ventilation support
   - BVM, Bi/CPAP, ETT if indicated
4. Nebulization therapy
   - Albuterol, Ipratropium bromide

EMERGENCY MEDICAL DISPATCHER

EMERGENCY MEDICAL RESPONDER

EMT

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
ADVISE PT SELF-ADMINISTRATION OF MEDICATIONS
(eg. ALBUTEROL INHALER)
AS PREVIOUSLY PRESCRIBED FOR ASTHMA SYMPTOMS

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR (if equipped)
ASSIST PT WITH PT'S OWN ALBUTEROL INHALER/NEBULIZER (when applicable)

EMT OR HIGHER LICENSE:

MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped,**Mandatory use if pt intubated)
ADULT: APPLY Bi/CPAP IF INDICATED (if equipped)

ADULT & PEDIATRIC WEIGHT ≥15kg: NEBULIZED ALBUTEROL 5mg & IPRATROPIUM BROMIDE 0.5 mg
PEDIATRIC WEIGHT <15kg: NEBULIZED ALBUTEROL 2.5mg & IPRATROPIUM BROMIDE 0.25 mg
MAY REPEAT ALBUTEROL ENROUTE X 2 AS NEEDED
FOR SEVERE ASTHMA REFRACTORY TO NEBULIZATION:
ADULT: EPINEPHRINE 1:1000 0.3 mg (0.3 mL) AUTOINJECTOR INTRAMUSCULAR INJECTION IN THIGH
PEDIATRIC: EPINEPHRINE 1:1000 0.15 mg (0.15 mL) AUTOINJECTOR INTRAMUSCULAR INJECTION IN THIGH
OLMC ORDER ONLY FOR EPHINEPHRINE IF PT ≥50 YEARS OLD, HEART ILLNESS HISTORY, OR BLOOD PRESSURE >140/90 mmHg

PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ADULT: METHYLPREDNISOLONE 125 mg IVP. MAY GIVE IM IF NO VASCULAR ACCESS OBTAINED.
PEDIATRIC: METHYLPREDNISOLONE 2 mg/kg NOT TO EXCEED 125 mg IVP. MAY GIVE IM IF NO VASCULAR ACCESS OBTAINED.

FOR SEVERE ASTHMA REFRACTORY TO NEBULIZATION:
ADULT: EPINEPHRINE 1:1000 0.3mg (0.3mL) IM
PEDIATRIC: EPINEPHRINE 1:1000 0.01 mg/kg (0.01 mL/kg) NOT TO EXCEED 0.3 mg (0.3 mL) IM
OLMC CONSULT FOR EPHINEPHRINE IF PT ≥50 YEARS OLD, HEART ILLNESS HISTORY, OR BLOOD PRESSURE >140/90 mmHg
ADULT: MAGNESIUM SULFATE 1 GRAM VERY SLOW IVP OVER 10 MINS
ADULT: MEDICATION-ASSISTED INTUBATION IF INDICATED
CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
3C– Dyspnea – Asthma - Adult & Pediatric

1. VandenHoek TL, Morrison LJ, Shuster M, Donnino M, Sinz E, Lavonas EJ, Jeejeebhoy FM, Gabrielli A. Part 12: cardiac arrest in special situations: 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Circulation. 2010;122(suppl 3):S829–S861.
2. Walker DM.Update on epinephrine (adrenaline) for pediatric emergencies.CurrOpinPediatr. 2009 Jun;21(3):313-9.
3. Simons FE, Lieberman PL, Read EJ Jr, Edwards ES.Simons FE, Lieberman PL, Read EJ Jr, Edwards ES.Hazards of unintentional injection of epinephrine from autoinjectors: a systematic review.Ann Allergy Asthma Immunol. 2009 Apr;102(4):282-7.
4. Myers JB, Slovis CM, Eckstein M, Goodloe JM, Isaacs SM, Loflin JR, Mechem CC, Richmond NJ, Pepe PE; U.S. Metropolitan Municipalities' EMS Medical Directors. Evidence-based performance measures for emergency medical services systems: a model for expanded EMS benchmarking. PrehospEmerg Care. 2008 Apr-Jun;12(2):141-51.
5. Bryson D, Camargo CADomeier RM, Gaeta TJ, Hendeles L, Hise S, Nowak RM, Russotti R, Sapien R, Wallace D, Wright JL, Boss L, Greiling A, Redd S, Workgroup on EMS Management of Asthma Exacerbations.A model protocol for emergency medical services management of asthma exacerbations.PrehospEmerg Care.2006 Oct-Dec;10(4):418-429.
6. Rowe BH, Camargo CA Jr.Emergency department treatment of severe acute asthma.Ann Emerg Med. 2006 Jun;47(6):564-6.
7. Richmond NJ, Silverman R, Kusick M, Matallana L, Winokur J.Out-of-hospital administration of albuterol for asthma by basic life support providers.AcadEmerg Med. 2005 May;12(5):396-403.
8. Thompson M, Wise S, and Rodenberg H. A preliminary comparison of levalbuterol and albuterol in prehospital care. J Emerg Med. 2004; 26(3):271-277
9. Markenson D, Foltin G, Tunik M, Cooper A, Treiber M, Caravaglia K. Albuterol sulfate administration by EMT-basics: results of a demonstration project. PrehospEmerg Care. 2004 Jan-Mar;8(1):34-40.
10. Delbridge T, Domeier R, Key CB.Prehospital asthma management.PrehospEmerg Care. 2003 Jan-Mar;7(1):42-7.
11. Meduri GU, Cook TR, Turner RE, Cohen M, Leeper KV.Noninvasive positive pressure ventilation in status asthmaticus.Chest. 1996 Sep;110(3):767-74.

Oklahoma State Department of Health

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EMS DIVISION

3D – DYSPNEA – CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) ADULT

TREATMENT PRIORITIES

1. Vital signs
   (including EtCO2, if equipped)
2. Oxygenation support
   - O_2 by NC, NRB
   - BVM, Bi/CPAP, ETT if indicated
3. Ventilation support
   - BVM, Bi/CPAP, ETT if indicated
4. Nebulization therapy
   - Albuterol, Ipratropium bromide

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
ADVISE PT SELF-ADMINISTRATION OF MEDICATIONS
(eg. ALBUTEROL INHALER)
AS PREVIOUSLY PRESCRIBED FOR COPD SYMPTOMS

EMERGENCY MEDICAL DISPATCHER

EMERGENCY MEDICAL RESPONDER

EMT

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

EMR | **EMT**

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (if equipped)
TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT
ASSIST PT WITH PT'S OWN ALBUTEROL INHALER/NEBULIZER (when applicable)

EMT OR HIGHER LICENSE:
MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped)
APPLY Bi/CPAP IF INDICATED (if equipped)
NEBULIZED ALBUTEROL 5mg & IPRATROPIUM BROMIDE 0.5 mg
MAY REPEAT ENROUTE X 2 AS NEEDED
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT-I85 | **AEMT**

INTUBATE IF INDICATED

IV ACCESS
IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

METHYLPREDNISOLONE 125 mg IVP. MAY GIVE IM IF NO VASCULAR ACCESS OBTAINED.

MEDICATION-ASSISTED INTUBATION IF INDICATED
CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
3D– Dyspnea – Chronic Obstructive Pulmonary Disease (COPD) - Adult

1. Wijesinghe M, Perrin K, Healy B, Hart K, Clay J, Weatherall M, Beasley R.Pre-hospital oxygen therapy in acute exacerbations of chronic obstructive pulmonary disease.Intern Med J. 2011 Aug;41(8): 618-22.
2. Schmidbauer W, Ahlers O, Spies C, Dreyer A, Mager G, Kerner T.Early prehospital use of non-invasive ventilation improves acute respiratory failure in acute exacerbation of chronic obstructive pulmonary disease.Emerg Med J. 2011 Jul;28(7):626-7.
3. Austin MA, Wills KE, Blizzard L, Walters EH, Wood-Baker R. Effect of high flow oxygen on mortality in chronic obstructive pulmonary disease patients in prehospital setting: randomised controlled trial. BMJ 2010 Oct 18;341:c5462.
4. Myers JB, Slovis CM, Eckstein M, Goodloe JM, Isaacs SM, Loflin JR, Mechem CC, Richmond NJ, Pepe PE; U.S. Metropolitan Municipalities' EMS Medical Directors. Evidence-based performance measures for emergency medical services systems: a model for expanded EMS benchmarking. PrehospEmerg Care. 2008 Apr-Jun;12(2):141-51.
5. Bryson D, Camargo CA, Domeier RM, Gaeta TJ, Hendeles L, Hise S, Nowak RM, Russotti R, Sapien R, Wallace D, Wright JL, Boss L, Greiling A, Redd S, Workgroup on EMS Management of Asthma Exacerbations.A model protocol for emergency medical services management of asthma exacerbations.PrehospEmerg Care.2006 Oct-Dec;10(4):418-429.
6. Perry E, Williams B.The quandary of prehospital oxygen administration in chronic obstructive pulmonary disease -- a review of the literature.J Emerg Prim Health Care. 2008; 6(1).
7. Richmond NJ, Silverman R, Kusick M, Matallana L, Winokur J.Out-of-hospital administration of albuterol for asthma by basic life support providers.AcadEmerg Med. 2005 May;12(5):396-403.
8. Thompson M, Wise S, and Rodenberg H. A preliminary comparison of levalbuterol and albuterol in prehospital care. J Emerg Med. 2004; 26(3):271-277
9. Markenson D, Foltin G, Tunik M, Cooper A, Treiber M, Caravaglia K. Albuterol sulfate administration by EMT-basics: results of a demonstration project. PrehospEmerg Care. 2004 Jan-Mar;8(1):34-40.

3E – DYSPNEA – CONGESTIVE HEART FAILURE (CHF) ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Vital signs (including EtCO2, if equipped)
2. Oxygenation support
   - O_2 by NC, NRB
   - BVM, Bi/CPAP, ETT if indicated
3. Ventilation support
   - BVM, Bi/CPAP, ETT if indicated
4. Cardiac pre-load & after-load reduction
   - Adult: Nitroglycerin
   - Pediatric: OLMC CONSULT

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
ADVISE PT SELF-ADMINISTRATION OF MEDICATIONS
(eg. NITROGLYCERIN SPRAY/TABS)
AS PREVIOUSLY PRESCRIBED FOR CHF SYMPTOMS

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (if equipped)
TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT

EMT OR HIGHER LICENSE:
MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped)
ADULT: APPLY Bi/CPAP IF INDICATED (if equipped)
ADULT: ASSIST PT WITH PT OWN NITROGLYCERIN AS PREVIOUSLY PRESCRIBED FOR CHF SYMPTOMS IF SYS BP ≥ 100 mmHg
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ADULT: MEDICATION-ASSISTED INTUBATION IF INDICATED

ADULT: PHARMACOLOGIC TREATMENT IF SYS BP ≥ 100 mmHg:
NITROGLYCERIN 0.4 mg SUBLINGUAL EVERY 5 MINS UNLESS SYS BP <100 mmHg
ADULT: PHARMACOLOGIC TREATMENT IF SYS BP < 100 mmHg:
DOPAMINE 5-20 mcg/kg/min TITRATE TO SYS BP ≥ 100mmHg
PEDIATRIC: OLMC CONSULT FOR PHARMACOLOGIC TREATMENT

TREAT PER PROTOCOL 5C - ACUTE CORONARY SYNDROME AND/OR DYSRHYTHMIA PROTOCOL(S) AS INDICATED
CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
3E– Dyspnea – Congestive Heart Failure (CHF) - Adult & Pediatric

1. Dib JE, Matin SA, Luckert A. Prehospital Use of Continuous Positive Airway Pressure for Acute Severe Congestive Heart Failure. J Emerg Med. 2012 42(5):553-558.
2. Bledsoe BE, Anderson E, Hodnick R, Johnson L, Johnson S, Dievendorf E. Low-fractional oxygen concentration continuous positive airway pressure is effective in the prehospital setting. PrehospEmerg Care. 2012 Apr-Jun;16(2):217-21.
3. Maak CA, Tabas, JA, McClintock DE. Should Acute Treatment with Inhaled Beta Agonists be Withheld from Patients with Dyspnea Who May Have Heart Failure? J Emerg Med. 2011 40(2):135-145.
4. Neumar RW, Otto CW, Link MS, Kronick SL, Shuster M, Callaway CW, Kudenchuk PJ, Ornato JP, McNally B, Silvers SM, Passman RS, White RD, Hess EP, Tang W, Davis D, Sinz E, Morrison LJ. Part 8: adult advanced cardiovascular life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S729–S767.
5. O'Connor RE, Brady W, Brooks SC, Diercks D, Egan J, Ghaemmaghami C, Menon V, O'Neil BJ, Travers AH, Yannopoulos D. Part 10: acute coronary syndromes: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S787–S817.
6. Warner GS. Evaluation of the effect of prehospital application of continuous positive airway pressure therapy in acute respiratory distress. Prehosp Disaster Med. 2010 Jan-Feb; 25(1): 87-91.
7. McKinney J, Brywczynski J, Slovis CM. Med under scrutiny: the declining roles of furosemide, morphine & beta blockers in prehospital care. JEMS. 2009 Jan;34(1):10-2.
8. Mattu A, Lawner B. Prehospital Management of Congestive Heart Failure. In Management of Heart Failure in the Emergent Situation, Heart Failure Clinics 2009 5(1):19-24.
9. Hubble MW, Richards ME, Jarvis R, Millikan T, Young D. Effectiveness of prehospital continuous positive airway pressure in the management of acute pulmonary edema. PrehospEmerg Care. 2006 Oct-Dec;10(4):430-9.
10. Jaronik J, Mikkelson P, Fales W, Overton DT. Evaluation of prehospital use of furosemide in patients with respiratory distress. PrehospEmerg Care. 2006 Apr-Jun;10(2):194-7.

3F – DYSPNEA – APPARENT LIFE THREATENING EVENT (ALTE) PEDIATRIC

TREATMENT PRIORITIES

1. Vital signs
   (including EtCO2, if equipped)
2. Oxygenation support
   - O_2 by NC, NRB
   - BVM if indicated
3. Ventilation support
   - BVM if indicated
4. Transport for further evaluation

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

KEEP PATIENT FREE FROM INJURY HAZARDS
AVOID PLACING ANYTHING IN MOUTH
PLACE IN POSITION OF RESPIRATORY COMFORT

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
HISTORY – NUMBER & LENGTH OF EPISODE(S)? EPISODE(S) IN PAST? PREVIOUS DIAGNOSIS?
APNEA? SKIN COLOR CHANGE? PERIORAL CYANOSIS? SEIZURE ACTIVITY?
APPLY CARDIAC MONITOR (if equipped)

EMT OR HIGHER LICENSE:
MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped)

EMT-I85 / AEMT

IV ACCESS IF INDICATED
IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
3F – Dyspnea – Apparent Life Threatening Event – Pediatric

1. Romaneli MT, FragaAM, Morcillo AM, Tresoldi AT, Baracat EC.Factors associated with infant death after apparent life-threatening event (ALTE).J Pediatr (Rio J). 2010 Nov-Dec;86(6):515-9.
2. Zuckerbraun NS, Zomorrodi A, Pitetti RD.Occurrence of serious bacterial infection in infants aged 60 days or younger with an apparent life-threatening event.PediatrEmerg Care. 2009 Jan;25(1):19-25.
3. Kaji AH, Gausche-Hill M. Managing infants after an apparent life-threatening event.Emerg Med. 2008;40(10): 15-9
4. Santiago-Burruchaga M, Sánchez-Etxaniz J, Benito-Fernández J, Vázquez-Cordero C, Mintegi-Raso S, Labayru-Echeverría M, Vega-Martín MI. Assessment and management of infants with apparent life-threatening events in the paediatric emergency department. Eur J Emerg Med. 2008 Aug;15(4):203-8.
5. McGovern MC, Smith MB.Causes of apparent life threatening events in infants: a systematic review.Arch Dis Child. 2004 Nov;89(11):1043-8.
6. Stratton SJ, Taves A, Lewis RJ, Clements H, Henderson D, McCollough. Apparent life-threatening events in infants. High risk in the out-of-hospital environment AnnEmergMed. 2004 43(6):711-717.
7. De Piero AD, Teach SJ, Chamberlain JM.ED evaluation of infants after an apparent life-threatening event.Am J Emerg Med. 2004 Mar;22(2):83-6.
8. Davies F, Gupta R.Apparent life threatening events in infants presenting to an emergency department.Emerg Med J. 2002 Jan;19(1):11-6.

Oklahoma State Department of Health

Emergency Medicine University of Oklahoma
EMS DIVISION

3G – PULSE OXIMETRY ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:

1. Medical General Assessment/General Supportive Care
2. Trauma General Assessment/Trauma & Hypovolemic Shock Supportive Care
3. Acute Dyspnea (Uncertain Etiology, Asthma, COPD, CHF, ALTE).
4. Cardiovascular Disorders (Chest Pain, Acute Coronary Syndrome, Dysrhythmias).
5. Neurologic Disorders/Altered Mental Status (Stroke, Seizure, Syncope).
6. Toxicologic/Poisonings (Altered Mental Status, Dyspnea)
7. Trauma (Head, Face, Neck, Chest Injuries)

Contraindications: None

Technique:

A. Power on the pulse oximeter (may be included with monitor/defibrillator).
B. Select an appropriate site for measurement.
   1. Best skin color on hand (or foot/ear if pediatric).
   2. Not distal to acute suspected orthopedic injuries.
C. Place the infrared sensor on the patient.
D. Read the pulse rate and oximetry reading (SaO_2).

Precautions:

A. Pulse oximetry values may be inaccurate in hemodynamically compromised patients (shock), carbon monoxide poisonings/smoke inhalations, and any conditions that may cause methemoglobinemia or sulfhemoglobinemia. Always correlate the patient's clinical condition with SaO_2 readings.

B. Trends prove more informative than a single measurement. At least two measurements should be performed and documented when using pulse oximetry. In the setting of artificial airway placement, pulse oximetry should be utilized continuously.

Medical Literature References
3G– Pulse Oximetry - Adult

1. Aguilar SA, Davis DP.Latency of pulse oximetry signal with use of digital probes associated with inappropriate extubation during prehospital rapid sequence intubation in head injury patients: case examples.J Emerg Med. 2012 Apr;42(4):424-8.
2. Wijesinghe M, Perrin K, Healy B, Hart K, Clay J, Weatherall M, Beasley R.Pre-hospital oxygen therapy in acute exacerbations of chronic obstructive pulmonary disease.Intern Med J. 2011 Aug;41(8): 618-22.
3. Langhan ML, Ching K, Northrup V, Alletag M, Kadia P, Santucci K, Chen L.A randomized controlled trial of capnography in the correction of simulated endotracheal tube dislodgement.AcadEmerg Med. 2011 Jun;18(6):590-6.
4. Davis DP, Aguilar S, Sonnleitner C, Cohen M, Jennings M.Latency and loss of pulse oximetry signal with the use of digital probes during prehospital rapid-sequence intubation.PrehospEmerg Care. 2011 Jan-Mar;15(1):18-22.
5. Austin MA, Wills KE, Blizzard L, Walters EH, Wood-Baker R. Effect of high flow oxygen on mortality in chronic obstructive pulmonary disease patients in prehospital setting: randomised controlled trial. BMJ 2010 Oct 18;341:c5462.
6. Smithline HA, Rudnitzky N, Macomber S, Blank FS. Pulse oximetry using a disposable finger sensor placed on the forehead in hypoxic patients. J Emerg Med. 2010 Jul;39(1):121-5.
7. Callahan JM.Pulse oximetry in emergency medicine.Emerg Med Clin North Am. 2008 Nov;26(4):869-79, vii.
8. Perry E, Williams B.The quandary of prehospital oxygen administration in chronic obstructive pulmonary disease -- a review of the literature.J Emerg Prim Health Care. 2008; 6(1).
9. Davis DP, Hwang JQ, Dunford JV. Rate of decline in oxygen saturation at various pulse oximetry values with prehospital rapid sequence intubation. PrehospEmerg Care. 2008 Jan-Mar;12(1):46-51.
10. Van Dyk NT, Cloyd DJ, Rea TD, Eisenberg MS.The effect of pulse oximetry on emergency medical technician decision makingPrehospEmerg Care 2004 8(4):417-419.

3H – WAVEFORM CAPNOGRAPHY ADULT & PEDIATRIC

EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

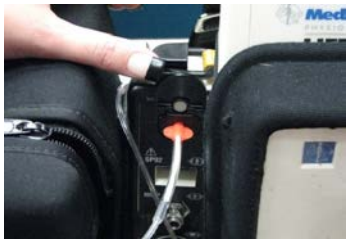
Indications:

1. Medical General Assessment/General Supportive Care.
2. Trauma General Assessment/Trauma & Hypovolemic Shock Supportive Care.
3. Acute Dyspnea (Uncertain Etiology, Asthma, COPD, CHF, ALTE).
4. Confirmation of Artificial Airway Placement – EARLY USE INDICATED; SEE PROTOCOL 2K.
5. Neurologic Disorders/Altered Mental Status (Stroke, Seizure, Syncope).
6. Toxicologic/Poisonings (Altered Mental Status, Dyspnea).
7. Trauma (Head, Face, Neck, Chest Injuries).

Contraindications: None

Technique:
(Physio-Control LifePak® 12/15 – see protocol Special Note):

1. Connect the CO_2 FilterLine® tubing by turning clockwise until securely fitted, evidenced by the wings in a horizontal position and the message "CO2 Initializing" appearing.



Critical Comment:

When CO_2 is **NOT** detected, three factors must be quickly assessed:

1. Loss of airway - apnea? esophageal endotracheal tube placement/migration? obstruction?
2. Circulatory collapse - cardiac arrest? massive pulmonary embolism? exsanguination?
3. Equipment failure - disconnected or malfunctioning bag-valve or ventilator?

PROTOCOL 3H: Waveform capnography – Adult & Pediatric, cont.

Critical Comment:

When CO_2 is **NOT** detected, three factors must be quickly assessed:

1. Loss of airway - apnea? esophageal endotracheal tube placement/migration? obstruction?
2. Circulatory collapse - cardiac arrest? massive pulmonary embolism? exsanguination?
3. Equipment failure - disconnected or malfunctioning bag-valve or ventilator?

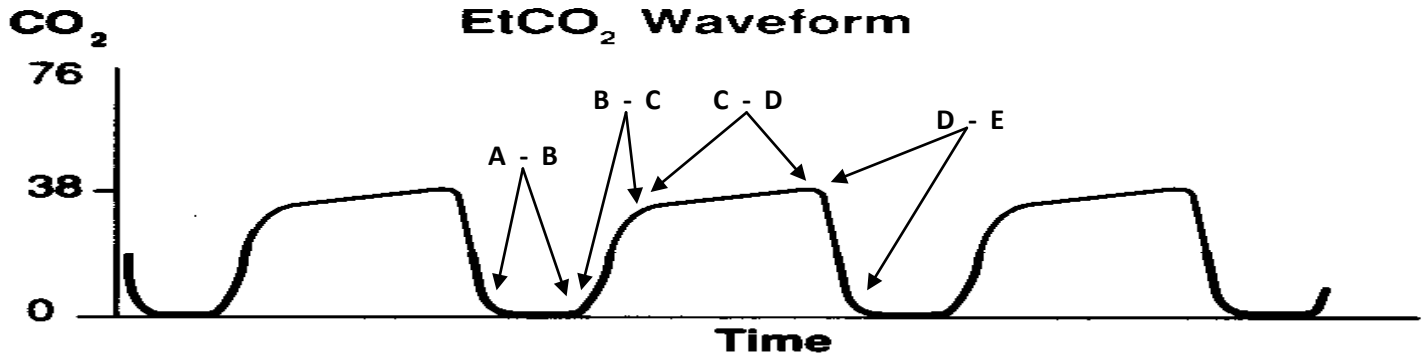
Interpreting Capnography:

The figure below shows a normal capnography waveform display. There are 4 phases of the waveform that require analysis. The flat **A** – **B** baseline segment (Respiratory Baseline) represents the beginning of exhalation of CO_2 – free gas that is contained in dead space from the conduction airways (trachea, bronchi). This value normally is zero. The **B** – **C** segment (Expiratory Upstroke), a sharp rise, represents exhalation of a mixture of dead space gases and alveolar gases. The **C** – **D** segment represents the alveolar plateau, characterized by exhalation of mostly alveolar gas. Point **D** is the end-tidal ($EtCO_2$) value that is recorded and displayed by the monitor, (peak concentration of CO_2 occurring at the end of expiration). The **D** – **E** segment (Inspiratory Downstroke), a sharp fall, reflects the inhalation of gases that are CO_2 – free (room air or supplemental oxygen). Alterations of the normal capnograph or $EtCO_2$ values are the result of changes in metabolism, circulation, ventilation, or equipment function.

A normal range for $EtCO_2$ is **35 – 45 mmHg**, similar to the range of CO_2 in arterial blood.

Normal Waveform:

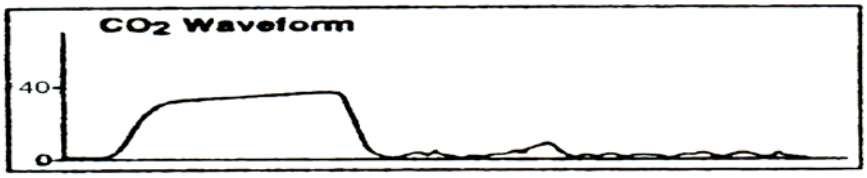
Normal Capnography Waveform



PROTOCOL 3H: Waveform capnography – Adult & Pediatric, cont.

Abnormal Waveforms:

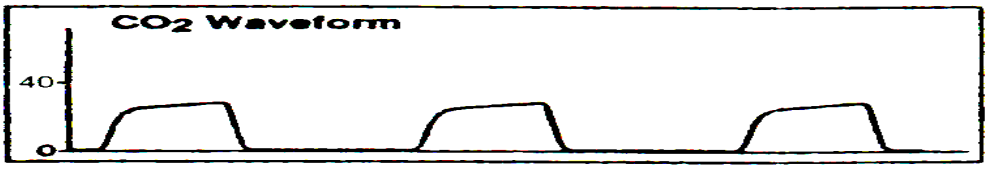
Sudden loss of $ETCO_2$ to zero or near zero:



Possible Causes:

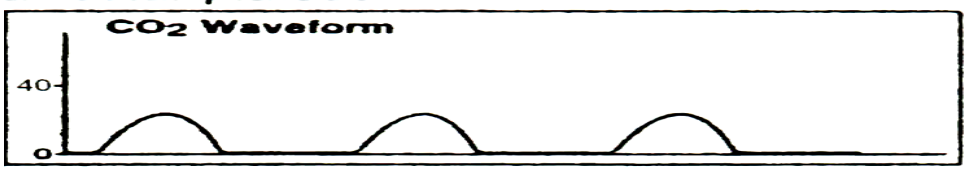
1. **Endotracheal tube in esophagus.**
2. **Incorrect Combitube® tube being utilized for assisted ventilations.**
3. **Apnea.**
4. Endotracheal tube or Combitube® not connected to capnography detector.
5. Total obstruction/mucus plugging.
6. Capnography malfunction - if abnormal waveform persists with change in capnography adaptor, the endotracheal tube or Combitube MUST be withdrawn and intubation or Combitube placement reattempted.

Sustained low $ETCO_2$ with good alveolar plateau:



Possible Causes:
1. Hyperventilation (due to underlying illness/injury or excessive assisted ventilations).
2. Hypothermia (Decrease in Metabolism).

Sustained low $ETCO_2$ without alveolar plateau:

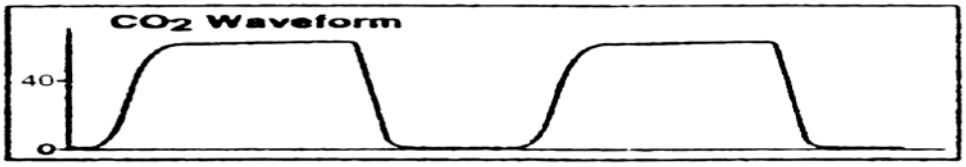


Possible causes:
1. Bronchospasm of asthma or COPD exacerbation.
2. Incomplete obstruction/mucus plugging.

PROTOCOL 3H: Waveform capnography – Adult & Pediatric, cont.

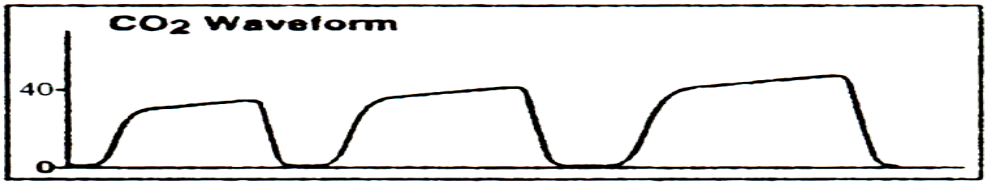
Abnormal Waveforms:

Elevated $ETCO_2$ with good alveolar plateau:



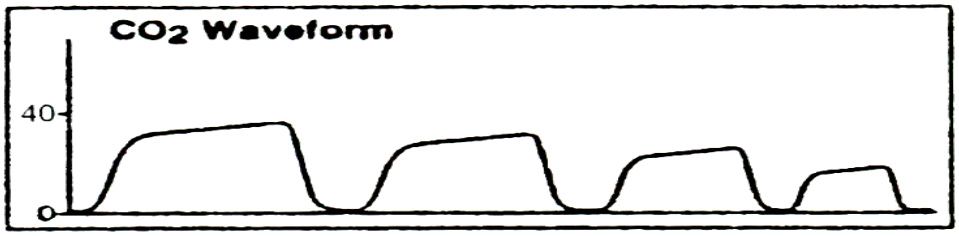
Possible causes:
1. Hypoventilation (due to underlying illness/injury or inadequate assisted ventilations).
2. Hyperthermia, pain, shivering (Increase in Metabolism).

Gradually increasing $ETCO_2$:



Possible causes:
1. Hypoventilation (due to underlying illness/injury or inadequate assisted ventilations).
2. Rising body temperature, increasing pain (Increasing Metabolism).

Exponential decrease in $ETCO_2$:



Possible causes:
1. Cardiopulmonary arrest.
2. Pulmonary embolism.
3. Sudden hypotension, massive blood loss, cardiopulmonary bypass.

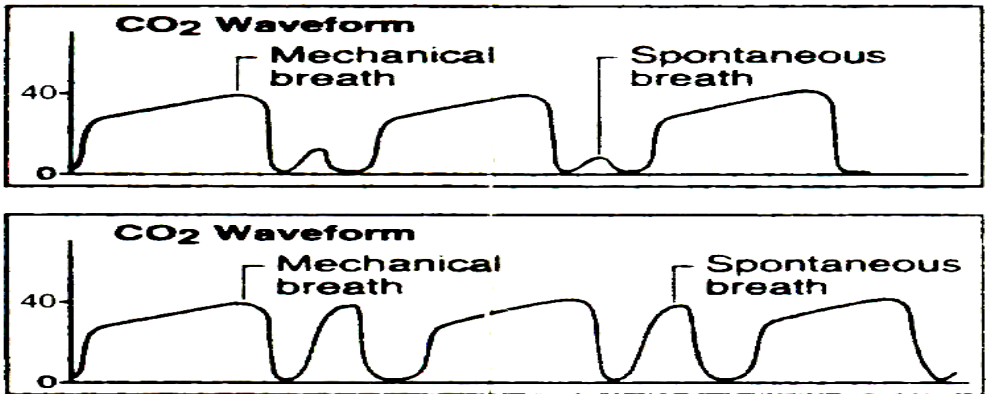
PROTOCOL 3H: Waveform capnography – Adult & Pediatric, cont.

Abnormal Waveforms:

Cardiogenic oscillations:

Cardiogenic oscillations are caused by changes in thoracic volume secondary to expansion and contraction of the myocardium with each heartbeat. They are usually seen in patients with small tidal volumes and slow respiratory rates, and are of little physiologic consequence.

Spontaneous breathing during mechanical ventilation:



Spontaneous breathing efforts may be evident on the CO2 waveform display. The patient on the top demonstrates poorer quality spontaneous breathing effort than the patient on the bottom.

PROTOCOL 3H: Waveform capnography – Adult & Pediatric, cont.

Troubleshooting Tips for EtCO2 monitoring:

Observation/Message	Possible Cause	Corrective Action
ALARM APNEA	No breath has been detected for 30 seconds since last valid breath	Check the patient, then ventilation equipment for leaks/disconnected tubing
CO2 FILTERLINE OFF	FilterLine®, or any other CO2 accessories disconnected or not securely connected to the LifePak® EtCO2 connector	Connect FilterLine®, or any other CO2 accessories, to input connector or tighten connection
CO2 FILTERLINE BLOCKAGE	FilterLine® is twisted or clogged. The message appears after 30 seconds of unsuccessful purging Airway Adapter clogged	Check the FilterLine® and if necessary replace it Check the Airway Adapter and necessary, replace it
CO2 FILTERLINE PURGING	FilterLine® tube twisted or clogged with water	Check the FilterLine® and if necessary, untwist or reconnect it
EtCO2 values erratic	A leak in the tubing Assisted ventilated patient breaths spontaneously	Check for connection leaks and line leaks to patient and correct if necessary
EtCO2 values are consistently higher or lower than expected	Physiological cause Ventilator/Assisted ventilation error	Check patient Check ventilator &/or assisted ventilation rate
XXX appears in place of EtCO2 value	CO2 module not calibrated successfully CO2 module failed	Notify appropriate supervisor/materials agent of critical equipment failure

PROTOCOL 3H: Waveform capnography – Adult & Pediatric, cont.

Special Note:

This protocol utilizes the Physio-Control LifePak® 12/15 to illustrate one method of performing waveform capnography. The Oklahoma Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the Physio-Control LifePak® 12/15 for waveform capnography by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in waveform capnography if not using the Physio-Control LifePak® 12/15

Medical Literature References
3H - Capnography - Adult & Pediatric

1. Goodloe JM. Basic Capnography. JEMS. 2012 Mar: s4-s7
2. Isbell CL, Batchinsky AI, Hetz KM, Baker WL, Cancio LC.Correlationbetweencapnography and arterial carbondioxidebefore, during, and afterseverechestinjury in swine.Shock. 2012 Jan;37(1):103-9.
3. White RD, Goodman BW, Arendt CJ. NeurologicallyIntactSurvivalFollowingProlongedCardiacArrestMonitoredWithContinuousCapnography and SubsequentTreatmentWithTherapeuticHypothermia. Mayo ClinProc. November 2011;86(11):1124-1126
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5. Einav S, Bromiker R, Weiniger CF, Matot I.Mathematical modeling for prediction of survival from resuscitation based on computerized continuous capnography: proof of concept.AcadEmerg Med. 2011 May;18(5):468-75.
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   Neumar RW, Otto CW, Link MS, Kronick SL, Shuster M, Callaway CW, Kudenchuk PJ, Ornato JP, McNally B, Silvers SM, Passman RS, White RD, Hess EP, Tang W, Davis D, Sinz E, Morrison LJ. Part 8: adult advanced cardiovascular life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S729–S767.
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8. Jabre P, Jacob L, Auger H, Jaulin C, Monribot M, Aurore A, Margenet A, Marty J, Combes X.Capnography monitoring in nonintubated patients with respiratory distress.Am J Emerg Med. 2009 Nov;27(9):1056-9.
9. Moses JM, Alexander JL, Agus MS.The correlation and level of agreement between end-tidal and blood gas pCO2 in children with respiratory distress: a retrospective analysis.BMC Pediatr. 2009 Mar 12;9:20.
10. Warner KJ, Cuschieri J, Garland B, Carlbom D, Baker D, Copass MK, Jurkovich GJ, Bulger EM.The utility of early end-tidal capnography in monitoring ventilation status after severe injury.J Trauma. 2009 Jan;66(1):26-31.
11. Silvestri S, Ralls GA, Krauss B, Thundiyil J, Rothrock SG, Senn A, Carter E, Falk J. The effectiveness of out-of-hospital use of continuous end-tidal carbon dioxide monitoring on the rate of unrecognized misplaced intubation within a regional emergency medical services system. Ann Emerg Med. 2005 May;45(5):497-503.
12. Katz SH, Falk JL. Misplaced endotracheal tubes by paramedics in an urban emergency medical services system. Ann Emerg Med. 2001 Jan;37(1):32-7.

3I – OXYGEN ADMINISTRATION ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:

Use in chronic conditions to include:

COPD – chronic bronchitis or emphysema
Chronic lung disease – lung cancer, sarcoidosis, pulmonary fibrosis, pulmonary hypertension.

EMS administration of O_2 may be at usual concentrations (e.g. nasal cannula flow at 2-3 liters per minute) or at higher concentrations than usual during acute dyspnea episodes (e.g. non-rebreather mask flow at 12 liters per minute) if the chronic pulmonary disease patient exhibits more than typical dyspnea or more than typical hypoxemia.

Use in acute conditions to include:

Respiratory arrest
Dyspnea – uncertain etiology, asthma, COPD, CHF, ALTE, acute allergic reaction
Cardiac arrest
Acute coronary syndrome (if associated with dyspnea or pulse oximetry< 94%)
Stroke (if associated with dyspnea or pulse oximetry< 94%)
Multi-systems trauma

EMS administration of O_2 should be goal-directed to achieve oxygen saturation levels, based on pulse oximetry, with a target level of 94–98% in most patients, or 88–92% in COPD patients.

Precautions:

Excessive oxygen levels can impair the respiratory drive in chronic pulmonary disease patients and paradoxically contribute to as much tissue disease as hypoxemia. Multiple studies show that **hyper**oxemia in certain ischemic tissue disease events (e.g. cardiac arrest, stroke) can lead to worse outcomes than normal oxygen levels. Treat hypoxemia, but avoid excessive oxygen levels that are unneeded in addressing patient symptoms of dyspnea or signs of respiratory failure (e.g. low pulse oximetry readings).

PROTOCOL 3I: Oxygen Administration – Adult & Pediatric, cont.

Supplemental oxygen concentration capabilities of different devices:

Via nasal cannula (NC) at 1 – 6 liters per minute (lpm), yields 24-44% concentration of inhaled oxygen (FiO_2 of 0.24 – 0.40). Typically, each additional liter flow will increase the concentration of inhaled oxygen by 4%. With higher lpm flows (5-6 lpm) via NC, nasal irritation and drying of mucosa can occur without use of humidified O_2.

There are a number of face mask options, such as the simple face mask, often used between 6 and 12 lpm, resulting in a concentration of oxygen to the patient between 40% and 50%. This is closely related to the more controlled air-entrainment masks, also known as Venturi masks, which can accurately deliver a predetermined oxygen concentration in a range of 24 - 50%.

In some instances, a partial rebreathing mask can be used, which is based on a non-rebreather mask, but with the valves over the exhalation ports removed. The partial rebreathing mask can provide oxygen concentrationin the 40 – 70% using up to 15 lpm flow.

Non-rebreather masks draw oxygen from an attached reservoir bags, with one-way valves that direct exhaled air out of the mask. When properly fitted and used at flow rates of 10-15 LPM or higher, they deliver 60 - 80% oxygen concentrations and occasionally higher, depending upon mask/face interface and valve function. Minimum lpm flow through a non-rebreather (even when using for presumed psychogenic hyperventilation) should be 10 lpm.

Medical Literature References
3I – Oxygen Administration – Adult & Pediatric

1. Berg RA, Hemphill R, Abella BS, Aufderheide TP, Cave DM, Hazinski MF, Lerner EB, Rea TD, Sayre MR, Swor RA. Part 5: Adult basic life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2010;122(suppl 3):S685–S705.
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3J – NEBULIZATION THERAPY ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMR may only assist with patient's own nebulizer

Indications:

1. Dyspnea – Uncertain Etiology
2. Dyspnea – Asthma
3. Dyspnea – Chronic Obstructive Pulmonary Disease (COPD)
4. Acute Allergic Reactions
5. Bronchospasm from toxic inhalations

Contraindications:

1. Non-bronchospastic respiratory distress (eg. clear presentation of CHF)

Technique:

A. Assemble nebulization device.
B. Fill nebulization chamber with medication to be nebulized.
C. Initiate 6-10 lpm O_2 flow if using hand-held nebulization device or via face mask.
D. Place nebulization chamber "in-line" with respiratory circuit if using nebulization via Bi/CPAP, supraglottic airway or endotracheal tube. Use continuing pre-nebulization lpm flow of O_2 to deliver nebulized medication through the respiratory circuit.

Repeat steps B – D as patient condition indicates per applicable protocol(s).

Medical Literature References
3J – Nebulization Therapy - Adult & Pediatric

1. Myers JB, Slovis CM, Eckstein M, Goodloe JM, Isaacs SM, Loflin JR, Mechem CC, Richmond NJ, Pepe PE; U.S. Metropolitan Municipalities' EMS Medical Directors. Evidence-based performance measures for emergency medical services systems: a model for expanded EMS benchmarking. Prehosp Emerg Care. 2008 Apr-Jun;12(2):141-51.
2. Bryson D, Camargo CA Domeier RM, Gaeta TJ, Hendeles L, Hise S, Nowak RM, Russotti R, Sapien R, Wallace D, Wright JL, Boss L, Greiling A, Redd S, Workgroup on EMS Management of Asthma Exacerbations. A model protocol for emergency medical services management of asthma exacerbations. Prehosp Emerg Care. 2006 Oct-Dec;10(4):418-429.
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3K – NON-INVASIVE POSTIVE PRESSURE VENTILATION (NIPPV) ADULT

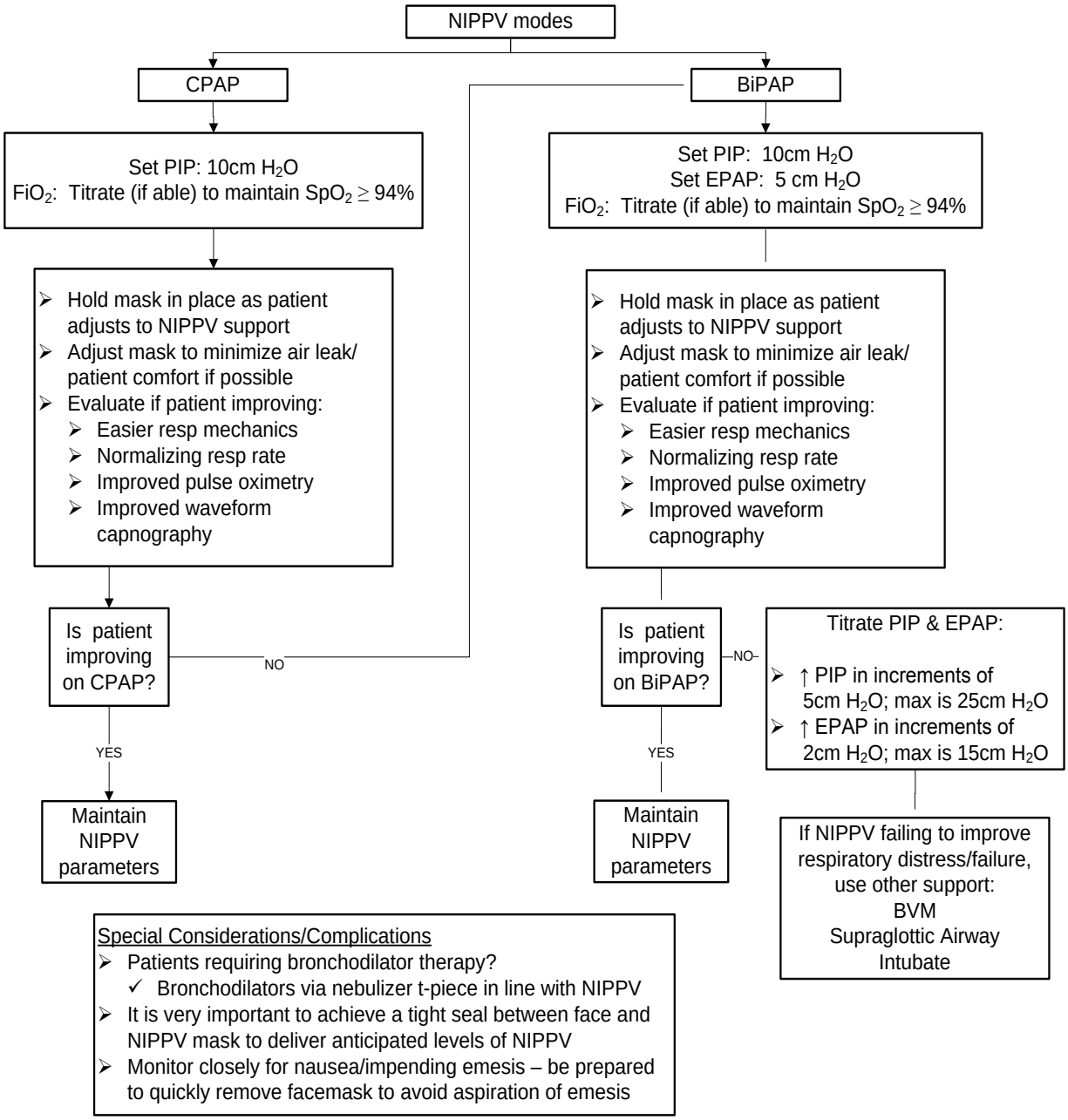
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:
1. Dyspnea – Uncertain Etiology – Adult.
2. Dyspnea – Asthma – Adult.
3. Dyspnea – Chronic Obstructive Pulmonary Disease (COPD) – Adult.
4. Dyspnea – Congestive Heart Failure (CHF) – Adult.
5. Acute Allergic Reactions – Adult (Dyspnea).
6. Water Submersion Event – Adult (Dyspnea).

Contraindications:
1. Apnea.
2. Pediatric dyspnea.
3. Adult dyspnea of lesser severity able to be managed without NIPPV.
4. Adult dyspnea of greater severity requiring invasive airway management.
5. Altered mental status preventing patient cooperation with NIPPV.
6. Active or suspected impending emesis.
7. High risk of aspiration/Impaired gag reflex.
8. Facial trauma/features impairing a tight NIPPV mask-face seal.

PROTOCOL 3K: Non – Invasive Positive Pressure Ventilation (NIPPV) - Adult, cont.

Bi/CPAP Ventilation Algorithm

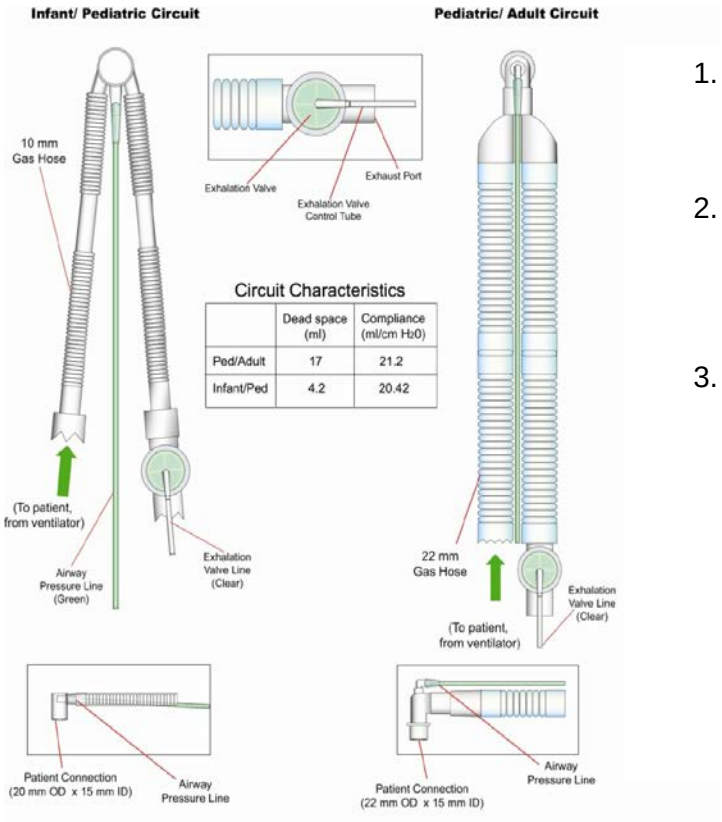


Special Considerations/Complications
- Patients requiring bronchodilator therapy?
  - ✓ Bronchodilators via nebulizer t-piece in line with NIPPV
- It is very important to achieve a tight seal between face and NIPPV mask to deliver anticipated levels of NIPPV
- Monitor closely for nausea/impending emesis – be prepared to quickly remove facemask to avoid aspiration of emesis

PROTOCOL 3K: Non – Invasive Positive Pressure Ventilation (NIPPV) - Adult, cont.

Technique (Impact 731 Model Series AEV® - see protocol Special Note):

Circuits:

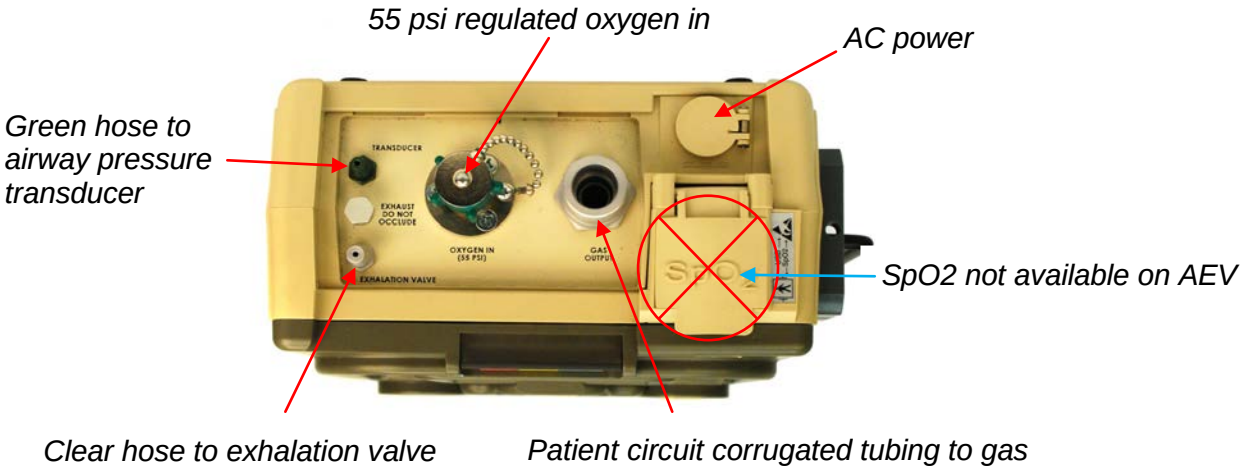


	Dead space (ml)	Compliance (ml/cm H2O)
Ped/Adult	17	21.2
Infant/Ped	4.2	20.42

1. AEV® ventilator circuits feature a low dead space design that minimizes CO2 re-breathing.
2. Note: dead space (circuit and HME) should never be greater than **25%** of the patient's tidal volume (set or spontaneous.
3. The 2 standard ventilator circuits cover the range of patient from infant through adult.
   - Pediatric/adult – patients 20 kg through adult, minimum tidal volume 200mL;
   - Infant/pediatric – 5 though 30kg, maximum tidal volume 300mL.***DO NOT USE FOR NIPPV

Connections- check the ventilator for proper operation before connecting to patient:

Step 1: Connect ventilator circuit (use test lung whenever possible) oxygen hose to 55 psi regulated output.



PROTOCOL 3K: Non – Invasive Positive Pressure Ventilation (NIPPV) - Adult, cont.

Step 2: Power

Turn power switch to "ON"

- Unit performs a Self-Check and AUTO-CAL of the internal transducers.
- AEV® then begins operation using the default settings.
- AUTO-CAL is performed every 5 minutes thereafter or when an altitude or temperature change is detected.
- Start-up settings may be changed during operation at any time.

Factory Defaults:

- *FiO2:* *21%*
- *High PIP Limit:* *35 cm H2O*
- *PEEP:* *5 cm H2O*
- *Vt:* *500 ml*
- *BPM:* *12*
- *I:E* *1:2.5*
- *Mode:* *AC (V)*

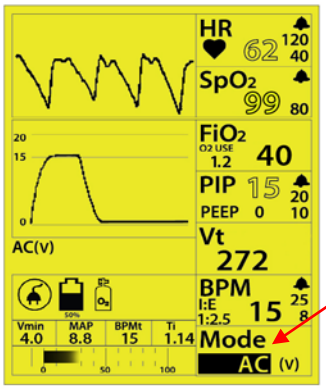
Step 3: Changing a Primary Parameter:

4. Press select "√" to accept new value

1. Press mode parameter button adjacent to setting to be changed.
2. Current value is highlighted.
3. Turn rotary encoder to desired value.

PROTOCOL 3K: Non – Invasive Positive Pressure Ventilation (NIPPV) - Adult, cont.

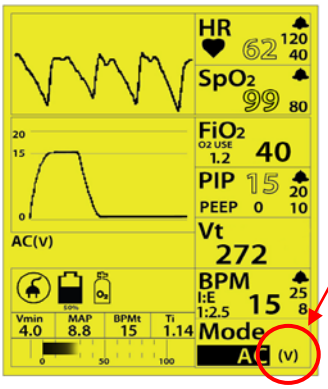
Changing a Primary Parameter:



Change the Mode by pressing the Mode parameter button and turn rotary encoder. Modes are:

- Assist/Control (AC)
- Continuous Positive Pressure Ventilation (CPAP)

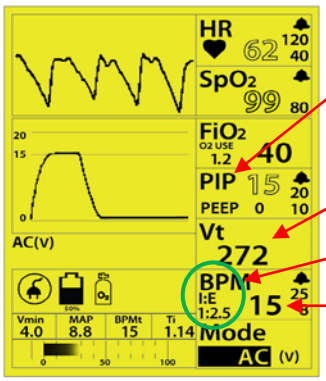
Changing a Secondary Parameter:



Select Breath Target:

- Volume (V) or
- Pressure (P)
- Press the mode parameter button twice; (V) is highlighted; then turn the rotary encoder to change to (P) and press Select "√" button to accept change.
- Note: pressing the parameter button sequentially highlights the primary parameter first and then scrolls through the secondary parameters moving clockwise.
- Repeat these steps to return to (V).

Volume Targeted Operation:



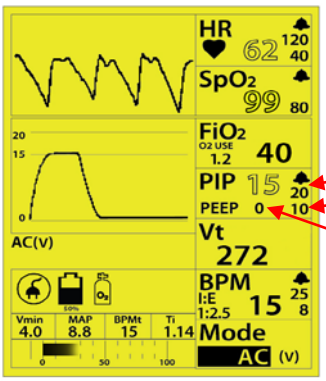
PIP (Peak Airway Pressure
Note: PIP cannot be adjusted during operation

Tidal volume controlled directly

Adjust I: E ratio

Adjust breathing rate

Volume Targeted Operation:



Adjust peak pressure limits:

PIP (Peak Airway Pressure)

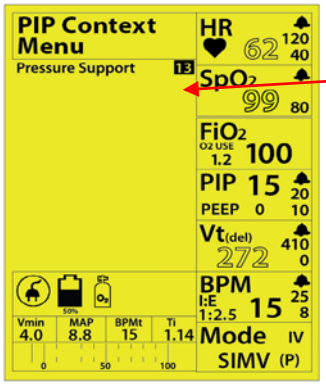
High Pressure

Low Pressure

Adjust PEEP

NOTE: trigger is PEEP compensated

Adding Pressure (PS) Support:

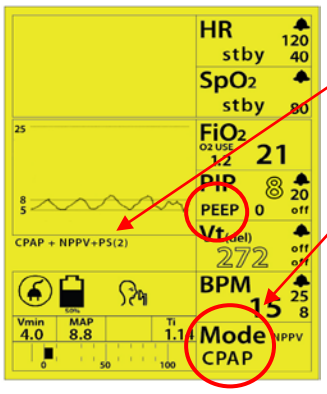


Press and hold the PIP button for 3 seconds

- Menu opens
- Adjust with rotary encoder to desired value. Range 0-60cm H_20
- Press Select "√".

Note: Value relative to PEEP pressure (PEEP + value). PS is only active in CPAP modes

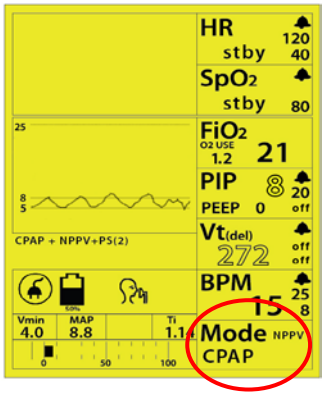
Using PS with CPAP (Bi-Level):



- Select the appropriate pressure support level (IPAP) inspiratory positive airway pressure.
- Choose the appropriate PEEP level (EPAP) expiratory positive airway pressure.
- Change mode to CPAP.
- Change the PPV setting to NPPV
- Acknowledge the NPPV application setting message..
- This achieves Bi-Level.

PROTOCOL 3K: Non – Invasive Positive Pressure Ventilation (NIPPV) - Adult, cont.

CPAP with NPPV:



- Press mode button to highlight the mode.
- Select CPAP and press "Accept"
- Press mode button twice to highlight "PPV" field-AEV only offers NPPV
- Adjust with Rotary Encoder to NPPV
- Pop Up message will appear and ask for confirmation
- Press Select "√" to confirm
- Select "√" again to activate

Special Note:

This protocol utilizes the Impact 731 Model Series AEV® to illustrate one method of performing NIPPV. The Oklahoma Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the Impact 731 Model Series AEV® for NIPPV by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in NIPPV if not using the Impact 731 Model Series AEV®.

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3K – Non-Invasive Positive Pressure Ventilation (NIPPV) – Adult

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3L – MECHANICAL VENTILATION ADULT

EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:
1. Respiratory Arrest.
2. Any Medical Etiology of Dyspnea or Airway Management Intubation.
3. Any Trauma Etiology of Dyspnea or Airway Management Intubation (except suspected pneumothorax).

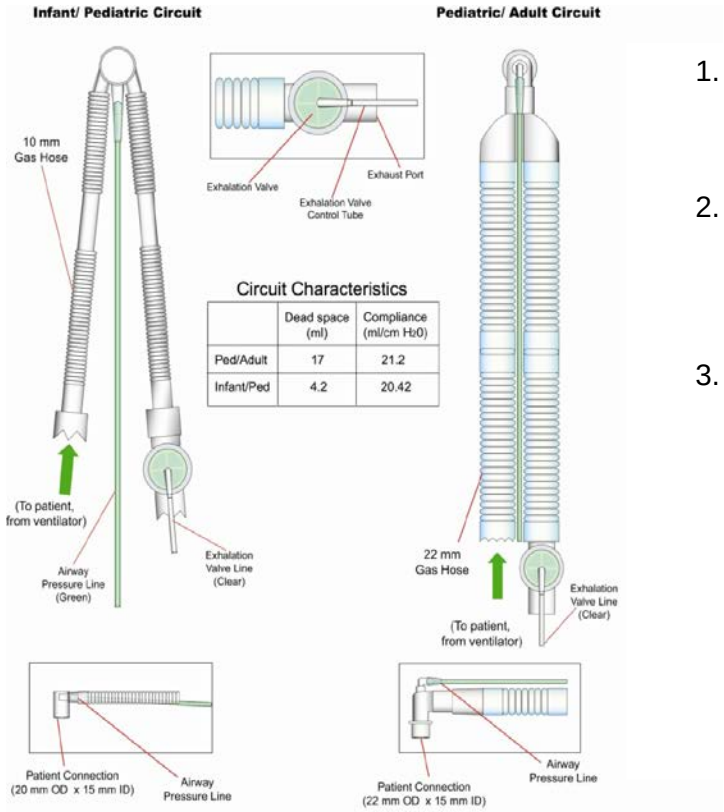
Contraindications:
1. Pediatric dyspnea.
2. Adult dyspnea of lesser severity able to be managed without mechanical ventilation.
3. Active or suspected impending emesis.
4. Suspected or impending pneumothorax/tension pneumothorax.

Technique (Impact 731 Model Series AEV® - see protocol Special Note):

Controls:

PROTOCOL 3L: Mechanical Ventilation - Adult, cont.

Circuits:

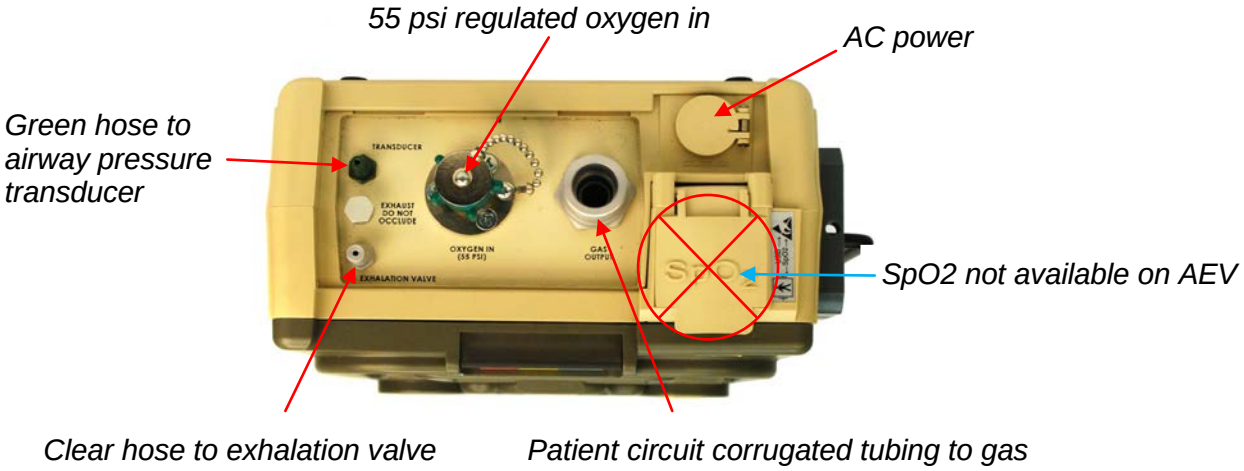


	Dead space (ml)	Compliance (ml/cm H2O)
Ped/Adult	17	21.2
Infant/Ped	4.2	20.42

1. AEV® ventilator circuits feature a low dead space design that minimizes CO2 re-breathing.
2. Note: dead space (circuit and HME) should never be greater than **25%** of the patient's tidal volume (set or spontaneous.
3. The 2 standard ventilator circuits cover the range of patient from infant through adult.
   - Pediatric/adult – patients 20 kg through adult, minimum tidal volume 200mL;
   - Infant/pediatric – 5 though 30kg, maximum tidal volume 300mL.***DO NOT USE FOR MECH VENT

Connections- check the ventilator for proper operation before connecting to patient:

Step 1: Connect ventilator circuit (use test lung whenever possible) oxygen hose to 55 psi regulated output.



PROTOCOL 3L: Mechanical Ventilation - Adult, cont.

Step 2: Power:

Turn power switch to "ON"

- Unit performs a Self-Check and AUTO-CAL of the internal transducers.
- AEV® then begins operation using the default settings.
- AUTO-CAL is performed every 5 minutes thereafter or when an altitude or temperature change is detected.
- Start-up settings may be changed during operation at any time.

Factory Defaults:

- *FiO2:* *21%*
- *High PIP Limit:* *35 cm H2O*
- *PEEP:* *5 cm H2O*
- *Vt:* *500 ml*
- *BPM:* *12*
- *I:E* *1:2.5*
- *Mode:* *AC (V)*

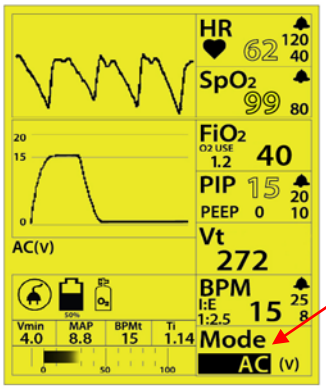
Step 3: Changing a Primary Parameter:

4. Press select "√" to accept new value

1. Press mode parameter button adjacent to setting to be changed.
2. Current value is highlighted.
3. Turn rotary encoder to desired value.

PROTOCOL 3L: Mechanical Ventilation - Adult, cont.

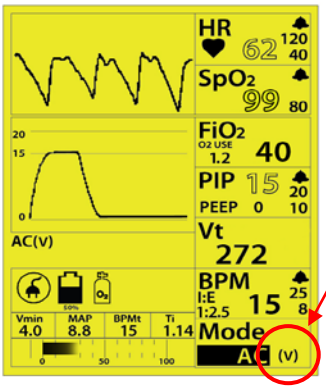
Changing a Primary Parameter:



Change the Mode by pressing the Mode parameter button and turn rotary encoder. Modes are:

- Assist/Control (AC)
- Continuous Positive Pressure Ventilation (CPAP)

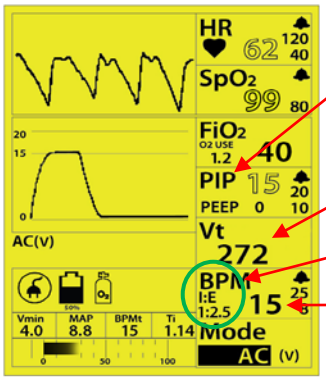
Changing a Secondary Parameter:



Select Breath Target:

- Volume (V) or
- Pressure (P)
- Press the mode parameter button twice; (V) is highlighted; then turn the rotary encoder to change to (P) and press Select "√" button to accept change.
- Note: pressing the parameter button sequentially highlights the primary parameter first and then scrolls through the secondary parameters moving clockwise.
- Repeat these steps to return to (V).

Volume Targeted Operation:



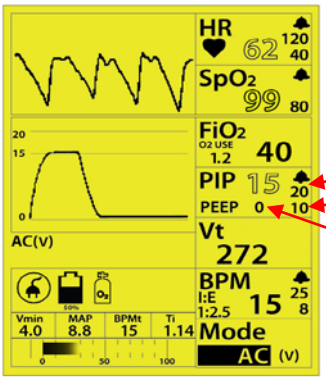
PIP (Peak Airway Pressure
Note: PIP cannot be adjusted during operation

Tidal volume controlled directly

Adjust I: E ratio

Adjust breathing rate

Volume Targeted Operation:



Adjust peak pressure limits:

PIP (Peak Airway Pressure)

High Pressure
Low Pressure

Adjust PEEP

NOTE: trigger is PEEP compensated

Safety notes:

A. Initial airway management and ventilation must not be compromised while preparing mechanical ventilation equipment.
B. If problems arise during AEV® use or if there is uncertainty about the adequacy of oxygenation and ventilations with the AEV®, then STOP and ensure oxygenation and ventilation with the usual methods.
C. Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using a bag-ventilation technique.
D. The incidence of a pneumothorax is increased in the presence of chest trauma with any form of positive pressure ventilation.
E. Gastric distention can cause resistance to mechanical ventilation. Gastric distention should be suspected in patients with an acutely distended abdomen after non-intubate positive pressure ventilation. Relieve gastric distention impairing respiratory mechanics with either a nasogastric or orogastric tube with low suction until distention is relieved.

Special Note:

This protocol utilizes the Impact 731 Model Series AEV® to illustrate one method of performing mechanical ventilation. The Oklahoma Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the Impact 731 Model Series AEV® for mechanical ventilation by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in mechanical ventilation if not using the Impact 731 Model Series AEV®.

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1. Cheskes S, Thomson S, Turner L. Feasibility of Continuous Positive Airway Pressure by Primary Care Paramedics. PrehospEmerg Care. 2012 Jun 11. [Epub ahead of print]
2. Bledsoe BE, Anderson E, Hodnick R, Johnson L, Johnson S, Dievendorf E. Low-fractional oxygen concentration continuous positive airway pressure is effective in the prehospital setting. PrehospEmerg Care. 2012 Apr-Jun;16(2):217-21.
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SECTION 4

CARDIAC ARREST

4A - RESUSCITATION (CPR) ADULT & PEDIATRIC

TREATMENT PRIORITIES:

1. Circulatory support
   - Chest compression rate 100-120/min
   - Appropriate compression depth & full recoil
   - Limit pauses in compressions
   - Timely defibrillation (if indicated)
   - Utilize Res-Q-Pod® (if equipped)
2. Oxygenation/Ventilation support
   - Avoid hyperventilation in rate & volume
   - Use waveform capnography (if equipped)
     **Mandatory use if patient intubated

EMD

CPR BY EMD INSTRUCTION

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMR / EMT

POSITION PATIENT FOR EFFECTIVE RESUSCITATION.
CHEST COMPRESSIONS AT 100-120 COMPRESSIONS/MINUTE. USE METRONOME TO GUIDE COMPRESSION RATE (if equipped).
LIMIT PAUSES IN CHEST COMPRESSIONS – AVOID PAUSES WHENEVER PHYSICALLY POSSIBLE.

APPLY AED (OR MANUAL DEFIBRILLATION PADS IF PARAMEDIC PRESENT).

IF CARDIAC ARREST DURATION ESTIMATED > 4 MINS AND WITHOUT GOOD QUALITY BYSTANDER CPR,
PERFORM CPR FOR 2 MINUTES PRIOR TO AED/RHYTHM ANALYSIS FOR DEFIBRILLATION DETERMINATION.

IF CARDIAC ARREST DURATION ESTIMATED ≤ 4 MINS, IMMEDIATE AED/RHYTHM ANALYSIS FOR DEFIBRILLATION DETERMINATION.

ADULT: 100-120 COMPRESSIONS/MINUTE WITH 8-10 VENTILATIONS/MINUTE WITHOUT PAUSE IN COMPRESSIONS.
ATTACH RES-Q-POD® (if equipped) TO BVM.
PEDIATRIC: 15 COMPRESSION : 2 VENTILATION CYCLES.
ATTACH RES-Q-POD® (if equipped) TO BVM IF PT ≥ 12 YEARS OF AGE AND ESTIMATED WEIGHT ≥ 50 kg.

FOLLOW AED PROMPTS FOR RHYTHM ANALYSIS & DEFIBRILLATION IF INDICATED (USING 2010 AHA STANDARDS).
AFTER AED SHOCK (IF APPLICABLE), IMMEDIATELY RESUME CPR FOR 2 MINUTES.
IF NO AED SHOCK ADVISED, IMMEDIATELY RESUME CPR FOR 2 MINUTES.

EMT OR HIGHER LICENSE ONLY:
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE.
IF RETURN OF SPONTANEOUS CIRCULATION, REFER TO PROTOCOL 4J – POST CARDIAC ARREST TREATMENT.

EMT-I85 / AEMT

ADULT: INTUBATE AFTER CPR INITIATED – FIRST ATTEMPT WITHOUT PAUSE IN COMPRESSIONS
LIMIT INTUBATION COMPRESSION PAUSE TO MAXIMUM OF 10 SECONDS

IV / IO ACCESS

PARAMEDIC

ASSESS FOR UNDERLYING ETIOLOGY OF CARDIAC ARREST & TREAT PER APPLICABLE PROTOCOL(S)
RHYTHM ANALYSIS AT NEXT APPROPRIATE RHYTHM CHECK
LIMIT RHYTHM ANALYSIS COMPRESSION PAUSE TO MAXIMUM OF 5 SECONDS
RHYTHM SPECIFIC MANAGEMENT PER APPLICABLE PROTOCOL(S) 4F – 4H

AT 20 MINS OF RESUSCITATIVE MEASURES (IF APPLICABLE):
TRANSPORT ASAP PER DESTINATION PROTOCOL **OR**
CONTACT OLMC FOR TERMINATION OF RESUSCITATION CONSULTATION
(IF APPLICABLE PER PROTOCOL 4K - TERMINATION OF RESUSCITATION)

Medical Literature References
4A – Resuscitation (CPR) – Adult & Pediatric

1. Idris AH, Guffey D, Aufderheide TP, Brown S, Morrison LJ, Nichols P, Powell J, Daya M, Bigham BL, Atkins DL, Berg R, Davis D, Stiell I, Sopko G, Nichol G. The Relationship Between Chest Compression Rates and Outcomes from Cardiac Arrest. Circulation. 2012; May 23. [Epub ahead of print].
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4B - RESUSCITATION TEAM ROLES ADULT & PEDIATRIC

Four + Rescuers/Compression & Ventilation Leader/Position 4 (P4)
Always outside CPR "triangle"

- Monitor time intervals
  - Calls for compressor change every 60 seconds
  - Calls for rhythm analysis every 2 minutes
- Monitor quality of CPR and use of metronome (if equipped) at 100-120 bpm
- Assure manual defibrillator in "paddles" mode
- Monitor for use of proper equipment/adjuncts (eg. ResQPod® if equipped)
- Gathers concise history from family/bystanders
- Keeps resuscitation area quiet so team members can hear
- Monitors for DNR issues
- Avoids direct patient care to maintain supervisory duties if greater than four rescuers throughout EMS resuscitation.
- Directs "staging" of personnel beyond six rescuers away from immediate resuscitation area to prevent crowding.
- Assumes duties of P5/P6 if limited to four rescuers throughout EMS resuscitation (if paramedic) and positions self in P5 or P6 position.

Three + Rescuers/Airway/Position 3 (P3)
Always at patient's head

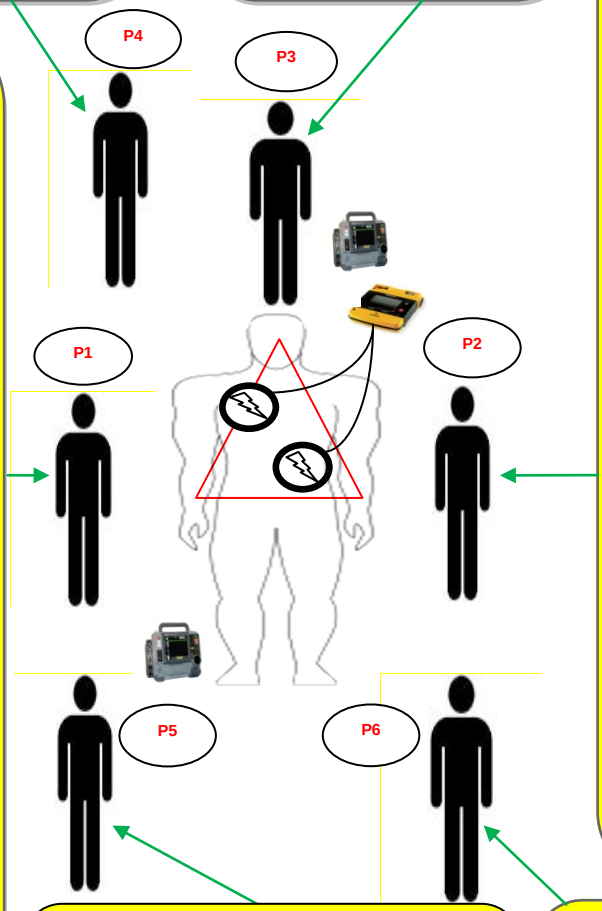
- Airway management per protocol(s)
  - for BVM ventilations, applies mask seal with both hands while P1 and P2 alternate bag squeezing during their respective compression off cycles. Squeezes bag only when P1 AND P2 busy with other tasks.
  - assist intermediate/paramedic during intubation as needed (if not intermediate or paramedic)
- Avoid compression interruptions for airway procedures (eg. supraglottic airway placement or intubation)

Two + Rescuers/Circulation 2/Position 2(P2)
Always on patient's left

- If more than two rescuers:
  - apply AED/manual defibrillator in first minute while P1 compressing
  - if good bystander CPR for arrest or estimated arrest≤4 mins, charge manual defib (if applicable) last 15 seconds of P1 compressions & prepare to deliver compressions after rhythm analysis
  - analyze rhythm (by AED or paramedic)
  - start chest compressions immediately if no defib indicated or immediately after defib (if indicated)
  - continuous chest compressions 1 min
    Adult/Pediatric:100-120/min
  - if no/poor bystander CPR for arrest or estimated arrest time > 4 mins, alternate compressions with P1
  - start compression metronome (if equipped) at 100-120 beats per min as soon as possible when P1 compressing (priority goes to AED/manual defibrillator attachment)
  - if BVM ventilations by P3 & when able, squeeze bag with ResQPod® light (if equipped) at 10/min rate in off compression cycle (while P1 compressing) as P3 maintains mask seal
- If two rescuers:
  - apply AED/manual defibrillator in first minute while P1 compressing
  - if good bystander CPR for arrest or estimated arrest time ≤4 mins, charge manual defib (if applicable) last 15 seconds of P1 compressions & prepare to deliver compressions after rhythm analysis
  - analyze rhythm (by AED or paramedic)
  - start chest compressions immediately if no defib indicated or immediately after defib (if indicated)
  - continuous chest compressions 1 min
    Adult/Pediatric: 100-120/min
  - pediatric 2 ventilations per 15 compressions by P1
  - if no/poor bystander CPR for arrest or estimated arrest time > 4 mins, alternate compressions with P1
  - start compression metronome (if equipped) at 100-120 beats per min as soon as possible when P1 compressing (priority goes to AED/manual defibrillator attachment)

Single Rescuer/Circulation 1/Position 1 (P1)
Always on patient's right

- If more than two rescuers:
  - continuous chest compressions 1 min
    Adult/Pediatric: 100-120/min
  - alternate compressions with P2
  - charge manual defib (if applicable)last 15 seconds of P2 compressions
  - analyze rhythm (by AED or paramedic)
  - if AED is used and defib indicated, resume chest compressions while AED is charging. Clear for defib. Resume compressions immediately after P2 delivers AED defib or paramedic delivers manual defib (if paramedic present &defib indicated)
  - if BVM ventilations by P3 & when able, squeeze bag with ResQPod® light (if equipped) at 10/min rate in off compression cycle (while P2 compressing) as P3 maintains mask seal
- If two rescuers:
  - continuous chest compressions 1 min
    Adult/Pediatric:100-120/min
  - adult passive oxygenation with NRB O2 in second minute when P2 compressing (passive oxygenation limited to first 6 mins of EMS resuscitation)
  - pediatric 2 ventilations per 15 compressions by P2
  - alternate compressions with P2
  - charge manual defib (if applicable) last 15 seconds of P2 compressions
  - if AED is used and defib indicated, resume chest compressions while AED is charging. Clear for defib. Resume compressions immediately after P2 delivers AED defib or paramedic delivers manual defib (if paramedic present &defib indicated)
- If alone and cardiac arrest duration estimated ≤ 4 mins:
  - apply AED/manual defibrillator
  - analyze rhythm (by AED or paramedic)
  - defib if indicated (by AED or paramedic) with compressions during AED or manual defib charging. Clear for defib.
  - call for additional help
  - continuous chest compressions
    Adult/Pediatric:100-120/min
  - maintain compressions and analyze rhythm by AED or paramedic every 2 minutes (with defib if indicated as above) until additional help arrives
- If alone and cardiac arrest duration estimated >4 mins:
  - call for additional help
  - continuous chest compressions 2 mins
    Adult/Pediatric:100-120/min
  - apply AED/manual defibrillator
  - analyze rhythm (by AED or paramedic)
  - defib if indicated (by AED or paramedic) with compressions during AED or manual defib charging. Clear for defib.
  - maintain compressions and analyze rhythm by AED or paramedic every 2 minutes (with defib if indicated as above) until additional help arrives



Five + Rescuers/Vascular and Medication/Position 5 (P5)Paramedic
Always outside CPR "triangle" at lower 1/2 of patient

- Initiates IV/IO access
- Administers medications per protocol(s) in consult with P6

Delivers manual defib (when indicated) if both P1 and P2 non-paramedic - in this situation monitor/manual defib moved from patient upper left to P5 location

Six + Rescuers/Resuscitation Leader/Position 6 (P6) Paramedic
Always outside CPR "triangle" at lower 1/2 of patient

- Maintains overall awareness of resuscitation dynamics
- "Busiest mental activity" position on team dictates little to no physical activity for success
- Interfaces with P1-5 as situation dictates
- Prioritizes communication with P1-3 through P4
- Assesses for etiologies of cardiac arrest
- Determines if termination of resuscitation appropriate
  - consult OLMC when indicated by protocol
  - communicates with family/bystanders if indicated

Medical Literature References
4B – Resuscitation Team Roles – Adult & Pediatric

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4C – AUTOMATED EXTERNAL DEFIBRILLATION (AED) ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:

Adults and pediatrics that are unresponsive, apneic or agonally breathing, and pulseless.

Contraindications:

None, though futile in obvious death (decapitation, rigor mortis, dependent lividity, and/or decomposition).

Technique (Physio-Control LifePak®1000 – see protocol Special Note):

1. Turn ON AED. (Figure 1)

2. Apply AED. Follow illustration on defibrillation pads for correct pad placement. (Figure 2)
   a. Avoid air spaces/incomplete skin contact under pads.
   b. Avoid pads overlapping one another.
   c. Avoid placing pads over suspected implanted pacemakers and/or implanted defibrillators.
   d. **NOTE (Pediatric):** If victim is less than 8 years old or under 25kg (55 lbs), connect the Infant/Child Reduced Energy Defibrillation Electrodes to the AED and proceed to STEP3.If Infant/Child Reduced Energy Defibrillation Electrodes are unavailable, place pads in anterior left chest – posterior left chest position and use a standard AED.
   e. **NOTE (Infant < 1 year of age):** Manual defibrillation preferred. Follow STEP 2d if manual defibrillation/paramedic unavailable.

Figure 1

Figure 2

Protocol 4C: Automated External Defibrillation (AED) – Adult& Pediatric, cont.

3. Follow AED visual and voice prompts. (Figure 3)
   a. If cardiac arrest duration estimated > 4 minutes and without good quality bystander CPR, perform CPR for 2 minutes prior to AED analysis for defibrillation determination.
   b. If cardiac arrest duration estimated ≤ 4 minutes, immediate AED analysis for defibrillation determination.
4. Follow all AED manufacturer recommendations for safe, effective, and accurate rhythm analysis and defibrillation.
5. Resuscitate victims of cardiac arrest per applicable protocol(s), minimizing pauses in chest compressions (see Protocol 4B – Resuscitation Team Roles).

Figure 3

<u>*Special Note:*</u>

This protocol utilizes the Physio-Control LifePak® 1000 to illustrate one method of automated external defibrillation. The Oklahoma State Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the Physio-Control LifePak®1000 for automated external defibrillation by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in automated external defibrillation if not using the Physio-Control LifePak®1000.

Medical Literature References
4C–Automated External Defibrillation (AED) – Adult & Pediatric

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4D – MANUAL DEFIBRILLATION ADULT & PEDIATRIC

PARAMEDIC

Indication:

Ventricular Fibrillation/Pulseless Ventricular Tachycardia

Contraindications:

Spontaneous pulse.
All cardiac rhythms except ventricular fibrillation/pulseless ventricular tachycardia.

Technique (Physio-Control LifePak® 15 – see protocol Special Note):

1. Power **ON**. (Figure 1)

2. Connect the therapy electrodes (defibrillation pads) to the therapy cable and confirm cable connection to the monitor/defibrillator. (Figure 2)

3. Prepare the patient's skin and apply therapy electrodes to the patient in either anterior right chest/lateral left chest (Figure 3) or anterior left chest/posterior left chest position.

4. Confirm desired energy is selected, or press **ENERGY SELECT** or rotate the **SPEED DIAL** to select the desired energy. (Figure 4)

Figure 1

Figure 2

Figure 3

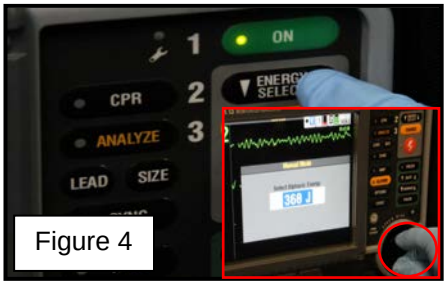

Figure 4

Protocol 4D: Manual Defibrillation, Adult & Pediatric, cont.

5. Press **CHARGE**. While the monitor/defibrillator is charging, a charging bar appears and a ramping tone sounds, indicating the charging energy level. When the monitor/defibrillator is fully charged, the screen displays available energy. (Figure 5).

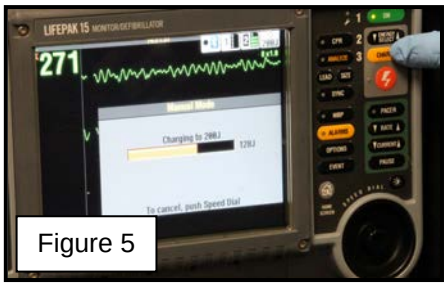

Figure 5

6. Make certain all personnel, including the operator of the monitor/defibrillator, are physically clear of the patient, stretcher, bed and any equipment connected to the patient.

7. Confirm ECG rhythm of ventricular fibrillation or pulseless ventricular tachycardia. Confirm available energy.

8. Press the (shock) button on the monitor/defibrillator to defibrillate the patient. (Figure 6)

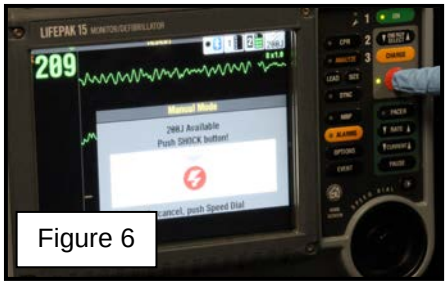

Figure 6

9. **NOTE:** To disarm (cancel the charge), press the SPEED DIAL. The monitor/defibrillator disarms automatically if shock buttons are not pressed within 60 seconds, or if the energy selection after charging begins.

10. Repeat procedure starting from Step 4, when indicated.

PEDIATRIC PATIENT:

If patient is less than 4 years of age and/or under 15kg weight, connect the Quik-Combo® Pediatric Electrodes to the monitor/defibrillator and proceed to Step 3. **NOTE**: Pediatric: Initial defibrillation 2 joules/kg with second and subsequent defibrillations at 4 joules/kg. Prior to determining manual defibrillation settings count prior AED defibrillations.

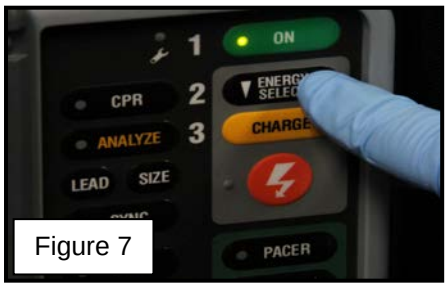

Figure 7

DEFIBRILLATION CLINICAL PEARLS:

1. In an emergency resuscitation setting that requires defibrillation, if unfamiliar with monitor/ defibrillator available, look for 1-2-3 sequence (Figure 7) that all monitor/defibrillators are labeled with by industry practice. 1 turns on the device; 2 selects energy; 3 charges the device. Typically, immediately next to 3 is the shock or discharge button.

2. In an emergency resuscitation setting that requires defibrillation, do not interrupt or pause chest compressions unless absolutely necessary. ***Continue to provide chest compressions while a monitor/defibrillator operator is applying defibrillation pads, powering on the monitor/defibrillator, selecting energy and charging the device.***

3. ***DO NOT CONTINUE TO PROVIDE CHEST COMPRESSIONS WHEN THE MONITOR/ DEFIBRILLATOR IS DISCHARGING / DEFIBRILLATING.***

Protocol 4D: Manual Defibrillation, Adult & Pediatric, cont.

Special Note:

This protocol utilizes the Physio-Control LifePak® 15 to illustrate one method of performing manual defibrillation. The Oklahoma State Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the Physio-Control LifePak® 15 for manual defibrillation by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in performing manual defibrillation if not using the Physio-Control LifePak® 15.

Medical Literature References
4D–Manual Defibrillation – Adult & Pediatric

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4E – MECHANICAL CHEST COMPRESSION - ADULT

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Mechanical chest compression devices have not been consistently validated to improve survival over high-quality manual CPR as described per Protocols 4A and 4B.

Indication: Non-traumatic cardiopulmonary arrest in the adult

Contraindications: Patient size not compatible with device.
Traumatic cardiopulmonary arrest.
Delay in manual chest compressions to utilize mechanical device.

Technique (LUCAS™2 System – see protocol Special Note):

1. Initiate manual CPR. (Figure 1)
2. **Activate (A)** mechanical CPR device.
3. Power on by pushing "ON/OFF" for one second to start self-test and power up sequence as shown by green LED adjacent to "ADJUST" illuminating. (Figure 2)
4. Minimizing pause in manual chest compressions, slide **back plate (B)** under the patient's upper half of chest and just below axilla level. (Figure 3)
5. Immediately resume manual chest compressions.
6. Remove **compression (C)** part of LUCAS™2 from carrier. Pull the release rings one to check that the claw locks open, then release rings. (Figure 4)
7. Pause manual compressions to attach the compression part to the back plate, listening for "click" and pulling up to check secure attachment of components. (Figure 5)
8. Position the suction cup over the chest, with the lower edge of the suction cup just superior to the end of the sternum.
9. For proper **depth (D)** of compression, push suction cup down using 2 fingers while device is in "ADJUST" mode. The pressure pad inside the suction cup should touch the patient's chest. If improper fit, quickly remove and resume manual compressions. (Figure 6)
10. Press "PAUSE" to lock the compression start position, then remove the fingers from the suction cup. (Figure 7)
11. **Engage (E)** compressions by pressing "ACTIVE" for continuous compressions. Maintain close supervision of the device throughout its active use. (Figure 8)
12. **Follow-up (F)** the compression starts by using the stabilization strap and support cushions. Do not manipulate the stabilization strap at the cost of delaying active mechanical compression start. (Figure 9)

Protocol 4E: Mechanical Chest Compression – Adult, cont.

13. Press "PAUSE" when indicated in resuscitation activity (eg. AED/rhythm analysis), though keeping interruptions to a minimum as per Protocol 4B – Resuscitation Team Roles. (Figure 10)

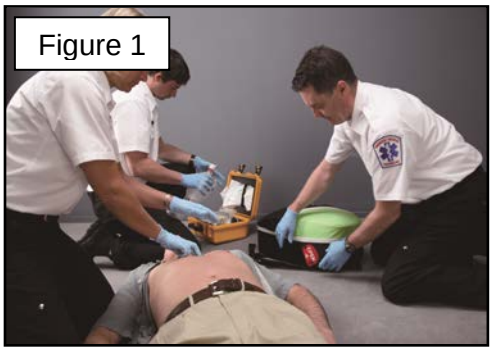
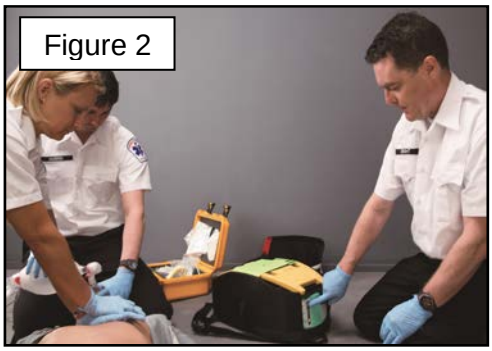


Figure 1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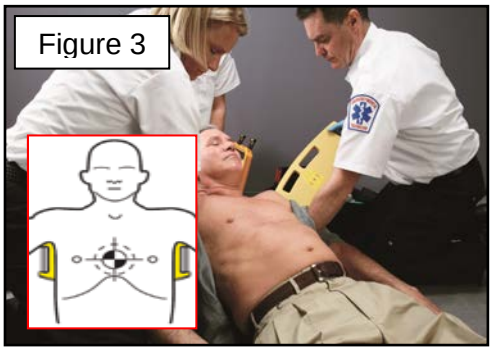
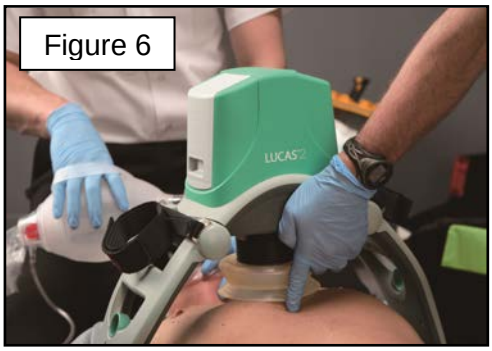


Figure 3

Figure 4

Figure 5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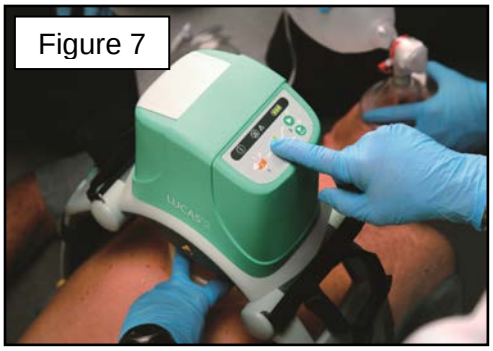
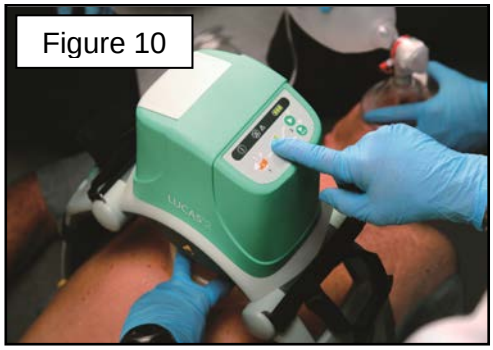


Figure 7

Figure 8

Protocol 4E: Mechanical Chest Compression – Adult, cont.



Special Note:

This protocol utilizes the Lucas™2 System to illustrate one method of performing mechanical chest compressions. The Oklahoma Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the Lucas™2 System for mechanical chest compressions directed by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in establishing and maintaining mechanical chest compressions if not using the Lucas™2 System.

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4F - ASYSTOLE ADULT & PEDIATRIC

TREATMENT PRIORITIES:

1. Continuous chest compressions 100-120/min
2. Evaluate and treat underlying cause(s)
3. Timely vasopressor administration
4. Resuscitation per Protocols 4A & 4B

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

PARAMEDIC

VASOPRESSOR ADMINISTRATION:
ADULT: EPINEPHRINE 1 mg IVP/IOP. REPEAT EVERY 3 – 5 MINUTES
PEDIATRIC: EPINEPHRINE 1:10,000 0.01 mg/kg (0.1 mL/kg) IVP/IOP. REPEAT EVERY 3-5 MINUTES

Medical Literature References
4F - Asystole – Adult & Pediatric

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4G VENTRICULAR FIBRILLATION & PULSELESS VENTRICULAR TACHYCARDIA ADULT & PEDIATRIC

TREATMENT PRIORITIES:

1. Continuous chest compressions 100-120/min
2. Timely defibrillation
3. Evaluate and treat underlying cause(s)
4. Timely vasopressor administration
5. Timely antiarrhythmic administration
6. Resuscitation per Protocols 4A & 4B

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

PARAMEDIC

MANUAL DEFIBRILLATION:
PAUSE CPR FOR A SINGLE SHOCK. LIMIT DEFIBRILLATION COMPRESSION PAUSE TO MAXIMUM OF 10 SECONDS.
ADULT: INITIAL DEFIB 200 JOULES, SECOND DEFIB 300 JOULES, THIRD & SUBSEQUENT DEFIBS 360 JOULES
PEDIATRIC: INITIAL DEFIB 2 JOULES/kg, SECOND & SUBSEQUENT DEFIBS 4 JOULES/kg
COUNT AED DEFIBRILLATIONS PRIOR TO DETERMINING MANUAL DEFIBRILLATION SETTING

VASOPRESSOR ADMINISTRATION:
ADULT: EPINEPHRINE 1 mg IVP/IOP. REPEAT EVERY 3-5 MINUTES
PEDIATRIC: EPINEPHRINE 1:10000 0.01 mg/kg (0.1 mL/kg) IVP/IOP. REPEAT EVERY 3-5 MINUTES

ANTIARRHYTHMIC ADMINISTRATION:
ADULT: AMIODARONE 300 mg IVP/IOP. REPEAT AT 150 mg IVP/IOP IN 5 MINUTES. MAXIMUM CUMULATIVE DOSE 450 mg.
EPINEPHRINE 1 mg IVP/IOP WITH EVERY AMIODARONE ADMINISTRATION

ADULT: MAGNESIUM SULFATE 1 gram IVP/IOP IF TORSADES (POLYMORPHIC PULSELESS VENTRICULAR TACHYCARDIA)

PEDIATRIC: AMIODARONE 5 mg/kg IVP/IOP SINGLE DOSE.
EPINEPHRINE 0.01 mg/kg (1:10,000. 0.1 mL/kg) WITH AMIODARONE ADMINISTRATION.

IF SUCCESSFUL CONVERSION TO SUSTAINED PULSATILE RHYTHM (RETURN OF SPONTANEOUS CIRCULATION):
ADULT: AMIODARONE 150 mg over 10 minutes (15 mg/min or 0.3 mL/min, **VERY SLOW** IVP/IVPB)
PEDIATRIC: OLMC CONSULT

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4G - Ventricular Fibrillation/Pulseless Ventricular Tachycardia – Adult & Pediatric

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4H – PULSELESS ELECTRICAL ACTIVITY ADULT & PEDIATRIC

TREATMENT PRIORITIES:

1. Continuous chest compressions 100-120/min
2. Evaluate and treat underlying cause(s)
3. Timely vasopressor administration
4. Resuscitation per Protocol 4A & 4B

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

PARAMEDIC

VASOPRESSOR ADMINISTRATION:
ADULT: EPINEPHRINE 1 mg IVP/IOP. REPEAT EVERY 3 – 5 MINUTES
PEDIATRIC: EPINEPHRINE 1:10,000 0.01 mg/kg (0.1 mL/kg) IVP/IOP. REPEAT EVERY 3-5 MINUTES

Medical Literature References
4H - Pulseless Electrical Activity – Adult & Pediatric

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4I - SPECIFIC CAUSES OF CARDIAC ARREST ADULT & PEDIATRIC

TREATMENT PRIORITIES:

1. Circulatory support
   - Chest compression rate 100-120/min
   - Appropriate compression depth & full recoil
   - Limit pauses in compressions
   - Timely defibrillation (if indicated)
   - Utilize Res-Q-Pod® (if equipped)
2. Oxygenation/Ventilation support
   - Avoid hyperventilation in rate & volume
   - Use waveform capnography (if equipped)
     **Mandatory use if patient intubated

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMR / EMT

CONSIDER POSSIBLE CAUSES OF CARDIOPULMONARY ARREST & TREAT WHERE APPROPRIATE:

HYPOXIA – OXYGENATION/VENTILATION WITH 100% O2
HYPOKALEMIA – RAPID TRANSPORT
PRE-EXISTING ACIDOSIS – OXYGENATION/VENTILATION WITH 100% O2
PRE-EXISTING HYPOTHERMIA (PROLONGED COLD EXPOSURE) – REWARM PATIENT
CARDIAC TAMPONADE – RAPID TRANSPORT
THROMBOSIS (AMI OR PE) – RAPID TRANSPORT
TRAUMA – SEE APPROPRIATE TRAUMA PROTOCOLS

EMT-I85 / AEMT

HYPOVOLEMIA
ADULT: 1000 mLNS IV/IO BOLUS IF NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: 20 mL/kg NS IV/IO BOLUS IF NO SIGNS OF PULMONARY EDEMA
HYPOGLYCEMIA
ADULT & PEDIATRIC WEIGHT ≥25 kg: IF GLUCOSE <50 mg/dL D50 1 m/kg IVP/IOP UP TO 50 mL
PEDIATRIC WEIGHT <25 kg: IF GLUCOSE <50 mg/dL D25 2mL/kg IVP/IOP UP TO 50 mL
CARDIAC TAMPONADE
ADULT: 500 mL NS IV/IO BOLUS IF NO SIGNS OFPULMONARY EDEMA
PEDIATRIC: 10 mL/kg NS IV/IO BOLUS IF NO SIGNS OF PULMONARY EDEMA

ADVANCED EMT OR HIGHER LICENSE:
TOXINS/DRUG OVERDOSE – SUSPECTED NARCOTIC/OPIATE
ADULT: NALOXONE 2 mg IVP/IOP, MAY REPEAT ONCE
PEDIATRIC: NALOXONE 0.5 mg IVP/IOP, MAY REPEAT ONCE

PARAMEDIC

CONSIDER POSSIBLE CAUSES OF CARDIOPULMONARY ARREST & TREAT WHERE APPROPRIATE:

HYPERKALEMIA – CALCIUM CHLORIDE 10 mg/kg IVP/IOP (MAX 1 gram) & SODIUM BICARBONATE 1 mEq/kg IVP/IOP (MAX 50 mEq)
PRE-EXISTING ACIDOSIS - SODIUM BICARBONATE 1 mEq/kg IVP/IOP (MAX 50 mEq)
TOXINS/DRUG OVERDOSE – SUSPECTED TRICYCLIC ANTIDEPRESSANT - SODIUM BICARBONATE 1 mEq/kg IVP/IOP (MAX 50 mEq)
TOXINS/DRUG OVERDOSE – SUSPECTED BETA BLOCKERS
ADULT: GLUCAGON 1 mg IVP/IOP
PEDIATRIC: GLUCAGON 0.5 mg IVP/IOP
TOXINS/DRUG OVERDOSE – SUSPECTED CALCIUM CHANNEL BLOCKERS - CALCIUM CHLORIDE 10 mg/kg IVP/IOP (MAX 1 gram)
TENSION PNEUMOTHORAX – NEEDLE THORACOSTOMY (CHEST DECOMPRESSION)

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4J - POST CARDIAC ARREST TREATMENT ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES

1. Support oxygenation/ventilation. Avoid hyperventilation. Avoid hyperoxemia (when possible).
2. Identify & treat underlying cause of cardiopulmonary arrest.
3. Achieve systolic blood pressure ≥ 100 mmHg using cold saline and / or vasopressor infusion.
4. Initiate therapeutic induced hypothermia (if applicable – receiving hospital must have capability for same).

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 NRB or BVM AS APPLICABLE
APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (if equipped))
TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT

IF PATIENT MEETS CRITERIA FOR INDUCED HYPOTHERMIA:
EXPOSE PATIENT AND COVER WITH SHEET
PACK AXILLA AND GROIN WITH ICE/COLD PACKS

EMT OR HIGHER LICENSE ONLY:
MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, ** Mandatory use if patient intubated))
PLACE SUPRAGLOTTIC AIRWAY ONLY IF INDICATED & BVM VENTILATIONS INEFECTIVE

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

IV/IO ACCESS
IF PATIENT MEETS CRITERIA FOR INDUCED HYPOTHERMIA:
IV/IO COLD (4 DEGREE CELSIUS) NS 30 mL/kg BOLUS UP TO 2 LITERS IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED
INTERPRET ECG/12-LEAD ECG – TREAT PER PROTOCOL 5C - ACUTE CORONARY SYNDROME AND/OR DYSRHYTHMIA PROTOCOL(S) AS APPLICABLE

ADULT: ACHIEVE SYSTOLIC BLOOD PRESSURE MINIMUM OF 100 mmHg
IV FLUID: NS BOLUS (MAY USE COLD SALINE) UP TO 2 LITERS TO ACHIEVE SYS BP ≥ 100 mmHg IF NO SIGNS OF PULMONARY EDEMA

DOPAMINE 10-20 mcg/kg/min IVPB/IOPB IF IV FLUID INEFFECTIVE OR CONTRAINDICATED
OR
NOREPINEPHRINE 2-4 mcg/kg/min IVPB/IOPB IF IV FLUID INEFFECTIVE OR CONTRAINDICATED

PEDIATRIC: ACHIEVE MINIMUM SYSTOLIC BLOOD PRESSURE OF (70 + 2 x age in years) mmHg
IV FLUID: NS BOLUS OF 20 mL/kg UP TO 60 mL/kg IF NO SIGNS OF PULMONARY EDEMA

OLMC CONSULT FOR PHARMACOLOGIC TREATMENT IF IV FLUID INEFFECTIVE OR CONTRAINDICATED

IF PATIENT MEETS CRITERIA FOR INDUCED HYPOTHERMIA:
SHIVERING CONTROL: MIDAZOLAM 0.1 mg/kg IVP/IOP MAXIMUM DOSE 5 mg

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

INCLUSION CRITERIA FOR INDUCTION OF HYPOTHERMIA

- **AGE ≥ 18 YEARS OF AGE**
- **RETURN OF SPONTANEOUS CIRCULATION**
- **NON-TRAUMATIC CARDIAC ARREST**
- **SUPRAGLOTTIC OR INTUBATION AIRWAY IN PLACE**
- **NO PURPOSEFUL RESPONSE TO PAIN**

EXCLUSION CRITERIA FOR INDUCTION OF HYPOTHERMIA

- **RECEIVING FACILITY DOES NOT PROVIDE COOLING**
- **MAJOR SURGERY (WITH HOSPITAL STAY) WITHIN 14 DAYS**
- **CHRONIC COMA PRIOR TO ARREST**
- **PREGNANCY**
- **SPONTANEOUS HYPOTHERMIA (COLD EXPOSURE)**

Medical Literature References
4J – Post Cardiac Arrest Treatment – Adult & Pediatric

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4K - "Do Not Resuscitate"/Advanced Directive Orders, Futility of Resuscitation Initiation, & Termination of Resuscitation Adult & Pediatric

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

"Do Not Resuscitate" & Advanced Directive Orders

Emergency Medical Responders, EMTs and Paramedics shall follow a physician's written Do-Not-Resuscitate (DNR) order, an Oklahoma DNR Consent Form, or an Advanced Health Care Directive accompanied by a written statement from two physicians that the patient is a "qualified" patient.

Situations will arise at scenes wherein persons may present themselves as the patient's family member or friend, stating that no resuscitative measures should be taken. These requests may only be honored if accompanied by appropriate documentation (any of the formats as noted previously in this protocol) or upon a written or verbal order from a physician previously established with the patient.

In any of the above confirmed situations, cease or withhold BVM ventilations, advanced airway placement, defibrillation, CPR, and antiarrhythmic and/or vasopressor medication administration. Provide all other appropriate care in accordance with applicable treatment protocols and procedures if the patient is not in respiratory or cardiac arrest, specifically addressing non-cardiopulmonary arrest conditions and maintaining appropriate comfort care for the patient.

Futility of Resuscitation Initiation

CPR should not be initiated (or continued if initiated by bystanders prior to arrival) by Emergency Medical Responders, EMTs, and paramedics in the following clinical conditions representing "obvious death" (regardless of cause of cardiac arrest):

No pulse AND
No spontaneous respirations AND
Pupils fixed (unreactive to light) AND
One or more of the following:

Rigor mortis.	Decomposition.
Decapitation.	Dependent lividity.

PROTOCOL 4K: "Do Not Resuscitate" Advanced Directive Orders, Futility of Resuscitation, & Termination of Resuscitation – Adult & Pediatric, cont.

Futility of Resuscitation Initiation, cont.

In blunt traumatic cardiac arrest, CPR should not be initiated (or continued if initiated by bystanders prior to arrival) by Emergency Medical Responders, EMTs, and Paramedics in the following clinical conditions:

No pulse AND
No spontaneous respirations AND
No shockable rhythm AND
No organized ECG activity, i.e., (patient is asystolic or PEA <40 beats per minute)

In penetrating traumatic cardiac arrest, CPR should not be initiated (or continued if initiated by bystanders prior to arrival) by Emergency Medical Responders, EMTs, & paramedics in the following clinical conditions:

No pulse AND
No spontaneous respirations AND
Pupils fixed (unreactive to light) AND
No spontaneous movement AND
No organized ECG activity (asystole or PEA <40 beats per minute)

Unless the above death criteria are clearly met, CPR and other resuscitative efforts should be initiated and aggressively delivered to promote the best chance of patient survival. In cases involving relative hypothermia (often involved in water submersion situations), ensure full resuscitative efforts are delivered as outlined in Protocol 11B - Cold Illness/Injury. In cases of lightning strike (without signs of "obvious death" as previously listed in this protocol), ensure full resuscitative efforts.

PROTOCOL 4K: "Do Not Resuscitate" Advanced Directive Orders, Futility of Resuscitation Initiation, & Termination of Resuscitation – Adult & Pediatric, cont.

Termination of Resuscitation

Evidence-based medicine supports the practice of field CPR termination in the following:

Adult, non-traumatic cardiac arrest patients who **have not responded to full resuscitative efforts delivered consistent with the 2013 State of Oklahoma Emergency Medical Services Protocols in the following circumstance in which Paramedic (or higher level) care is available within 20 minutes of first EMS contact with the patient:**

An adult patient who has a **non-EMS witnessed, non-traumatic cardiac arrest** and is **found in asystole or PEA upon Paramedic arrival** may be considered a candidate for field termination of resuscitation if they do not respond to full resuscitation efforts AND:

1) Location of cardiac arrest is a private residence or healthcare facility (e.g. nursing home).
2) ALS resuscitative efforts (CPR, successful placement of advanced airway, successful vascular access – IV or IO, and medication administration) have been continuously performed for 20 (twenty) minutes without return of spontaneous circulation (ROSC) or conversion of asystole or PEA to Ventricular Fibrillation/Ventricular Tachycardia at any time during the 20 minutes of advanced life support.
3) End-tidal carbon dioxide <20 mmHg at time of resuscitation termination.
4) The cardiac arrest did not occur in absolute or relative hypothermia.
5) The cardiac arrest did not occur due to apparent toxic agent exposure.

Adult, non-traumatic cardiac arrest patients who **have not responded to full resuscitative efforts delivered consistent with the 2013 State of Oklahoma Emergency Medical Services Protocols in the following circumstance in which Paramedic (or higher level) care is *NOT* available within 20 minutes of first EMS contact with the patient:**

An adult patient who has a **non-EMS witnessed, non-traumatic cardiac arrest** and is **found in a non-AED shockable rhythm upon first care arrival** may be considered a candidate for field termination of resuscitation if they do not respond to full resuscitation efforts AND:

1) Location of cardiac arrest is a private residence or healthcare facility (e.g. nursing home).
2) BLS/ALS (non-Paramedic level) resuscitative efforts (CPR, and the possible inclusion of successful placement of advanced airway, successful vascular access – IV or IO, and limited medication administration) have been continuously performed for 20 (twenty) minutes without return of spontaneous circulation (ROSC) or conversion of a non-AED shockable rhythm to an AED-shockable rhythm at any time during the 20 minutes of resuscitation.
3) The cardiac arrest did not occur in absolute or relative hypothermia.
4) The cardiac arrest did not occur due to apparent toxic agent exposure.

Termination of Resuscitation, cont.

Field termination of cardiac arrest resuscitation may be based on an attending or on-line medical control physician's order, either by direct voice communication or in writing. The order is based upon the physician's decision that the patient's condition is terminal, cardiovascular unresponsiveness has been established despite optimal out-of-hospital ALS emergency medical care, and biologic death has occurred. The paramedic's decision to stop the resuscitation shall be based on this physician's order.

Prior to field termination of resuscitation order requests, logistical factors should be considered such as family expectations, safety of crew and public if resuscitation is halted on scene, factors inhibiting safe patient movement, non-English-speaking family/cultural barriers, private physician order to continue resuscitation and transport, possible correctable causes of cardiac arrest yet untreated. EMS providers on-scene and the family member(s) should have access to resources including clergy, crisis workers, social workers, and other necessary personnel to ensure field termination of resuscitation can be achieved in an efficient, humane manner.

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SECTION 5

CARDIAC (NON-ARREST)

5A – CHEST PAIN – UNCERTAIN ETIOLOGY ADULT & PEDIATRIC

TREATMENT PRIORITIES

3 in 5 minutes of patient contact:
1. Vital signs
2. O_2 if indicated
3. ECG rhythm (if paramedic)

5 in 10 minutes of patient contact:
1. Adult - ASA
2. IV (If EMT-I85 or higher)
3. Adult – 12-lead ECG
4. Adult – if ACS per Protocol 5C
5. Repeat vital signs

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
ADULT: ADVISE ASPIRIN (ASA) 324/325 mg CHEWED BY PT (unless contraindicated).
ADULT: ADVISE NITROGLYCERIN (NTG)
PT SELF-ADMINISTRATION
AS PREVIOUSLY PRESCRIBED FOR SIMILAR SYMPTOMS

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC or NRB IF DYSPNEA or PULSE OX <94% AT ROOM AIR
APPLY CARDIAC MONITOR
ADULT: OBTAIN 12-LEAD ECG (if equipped)
ADULT: TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT
ADULT: ASA 324/325 mg CHEWED BY PT (hold if taken < 6 hours or contraindicated)
ADULT: ASSIST NTG SELF-ADMINISTRATION 0.4 mg (hold if SYS BP ≤ 100 mmHg)

EMT-I85 / AEMT

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

TREAT ANY CARDIAC DYSRHYTHMIAS/SHOCK BY THE RESPECTIVE PROTOCOLS
ADULT: ANALYZE 12-LEAD ECG – TREAT PER PROTOCOL 5C - ACUTE CORONARY SYNDROME IF INDICATED
NOTIFY RECEIVING HOSPITAL IMMEDIATELY IF SUSPECTED STEMI

ADULT: NTG 0.4 mg SI
SEE CONTRAINDICATIONS TO NTG & ERECTILE DYSFUNCTION MEDICATIONS IN PROTOCOLS 5C & 16F

ADULT: IF CHEST PAIN IMPROVED WITH INITIAL NTG:
IF PT STILL HAVING CHEST PAIN AFTER 3 NTG ADMINISTRATIONS & IF SYS BP > 100 mmHg:
ADDITIONAL NITROGLYCERIN PER PROTOCOL 16F
AND
MORPHINE SULFATE 2 mg SLOW IVP, MAY REPEAT EVERY 5 MIN TO A TOTAL OF 10 mg.
OR
FENTANYL 0.5 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 50 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 1.5 mcg/kg or 125 mcg WHICHEVER IS LESSER.
OR
HYDROMORPHONE 0.25 mg SLOW IVP .
MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 1 mg.

ADULT: IF CHEST PAIN NOT IMPROVED WITH INITIAL NTG: MAY TREAT WITH OPIATE OPTION ABOVE IF INDICATED
PEDIATRIC: CONSULT FOR TREATMENT DIRECTIVE(S) IF INDICATED

TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
5A – Chest Pain – Uncertain Etiology – Adult& Pediatric

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5B – ACQUIRING & TRANSMITTING 12–LEAD ECGs ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER

EMT

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

Indications:

1. Respiratory Arrest
2. Dyspnea – Uncertain Etiology
3. Dyspnea – Chronic Obstructive Pulmonary Disease
4. Dyspnea – Congestive Heart Failure
5. Dyspnea – Apparent Life Threatening Event
6. Post Return of Spontaneous Circulation from Cardiac Arrest
7. Chest Pain – Uncertain Etiology
8. Acute Coronary Syndrome
9. Bradycardia
10. Tachycardia – Stable
11. Tachycardia – Unstable
12. Premature Ventricular Contractions
13. Hypertensive Emergency
14. Stroke
15. Syncope
16. Poisonings
17. Conductive Energy Weapon Related Management
18. “Less Lethal” Weapon Related Management
19. Lightning/Electrical Injury

Contraindications:

None

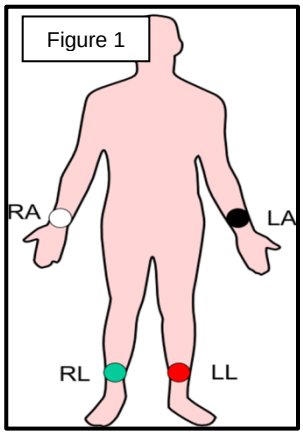
Protocol 5B: Acquiring & Transmitting 12–Lead ECGs – Adult& Pediatric, cont.

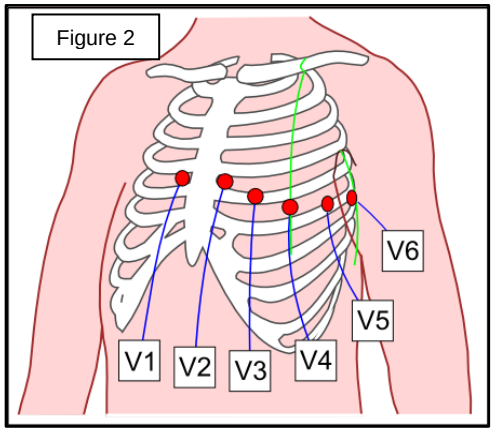
Technique (applicable to all 12-Lead ECG devices):

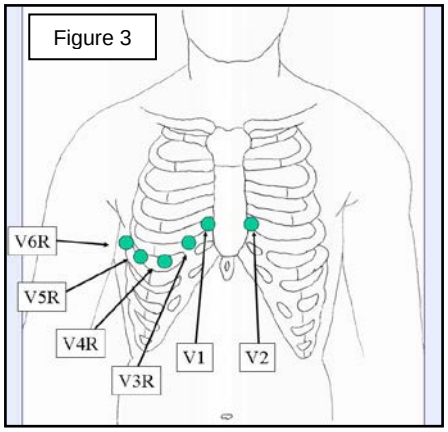
1. Prepare skin for electrode application. This may include hair removal with razor and/or rubbing the skin with a gauze (sterile or non-sterile) to remove oil and sweat. Both actions contribute to better electrode adhesion, leading to better quality 12-Lead ECGs.

2. For standard 12-Lead ECG, apply leads/electrodes as follows (Figures1 and 2):
   a. RA lead on right upper extremity, preferably distal on the extremity near the wrist on the palm side.
   b. LA lead (mirror image of RA) on the left upper extremity, preferably distal on the extremity near the wrist on the palm side.
   c. RL lead on the right lower extremity, preferably distal on the extremity near the ankle on the outside of the leg.
   d. LL lead (mirror image of RL) on the left lower extremity, preferably distal on the extremity near the ankle on the outside of the leg.
   e. V1 lead to the right of the sternum in the 4th intercostal space.
   f. V2 lead (mirror image of V1) to the left of the sternum in the 4th intercostal space.
   g. V4 lead is placed next and in the mid-clavicular line in the left 5th intercostal space.
   h. V3 lead in the middle of the line now created between leads V2 and V4.
   i. V5 lead in horizontal line with V4 at anterior axillary line of the left axilla.
   j. V6 lead in horizontal line with V5 at mid-axillary line of the left axilla.

3. For a "right-sided" 12-lead ECG to evaluate for right ventricular myocardial infarction in the setting of suspected left ventricular inferior wall ST segment elevation myocardial infarction, simply apply four additional electrodes on the right chest, mirroring V3, V4, V5, and V6. Then move the leads off of V3-V6 and place on their right-sided mirror electrode to create V3R, V4R, V5R, and V6R (Figure 2).







Protocol 5B: Acquiring & Transmitting 12–Lead ECGs – Adult & Pediatric, cont.

Technique (Physio-Control LifePak® 15 – see protocol Special Note):

To acquire and transmit a 12-lead ECG:

1. Press **ON**. (Figure 4)
2. Insert the lead attachments into the main cable. (Figure 5)
3. Insert the cable connector into the monitor's green ECG connector. (Figure 6)
4. Prepare patient's skin as described above.
5. Apply leads/electrodes as described above.
6. Instruct patient to remain still as possible during 12-Lead ECG acquisition to reduce movement artifact (to improve quality of 12-Lead ECG sent to emergency department).
7. Press **12-LEAD** to acquire ECG and enter patient demographic information of last name, first name, age, sex (gender), incident number (if applicable) using the speed dial.(Figures 7& 8)
8. Once 12–Lead ECG acquired, press **TRANSMIT**. (Figure 9)
9. In the TRANSMIT window, select 12-Lead **REPORT** to be sent. (Figure 10)
10. In the TRANSMIT window, select **SITE**.
11. In the SITE window, select desired transmission destination, typically a hospital's emergency department. (Figure 11)
12. In the TRANSMIT window, select **SEND**. (Figure 12)
13. The Physio-Control LifePak®15 should connect to the selected destination.
14. Once the transmission is completed a transaction message is automatically printed.
15. If the transmission fails, make at least one additional attempt at transmission.

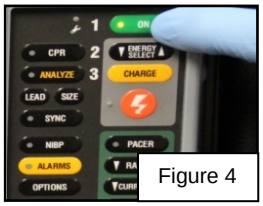


Figure 4

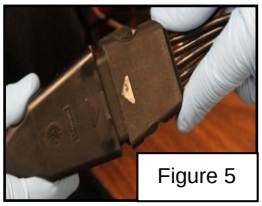


Figure 5

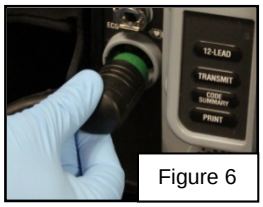


Figure 6

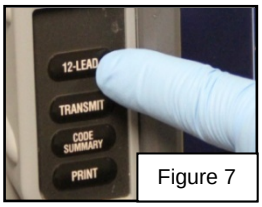


Figure 7

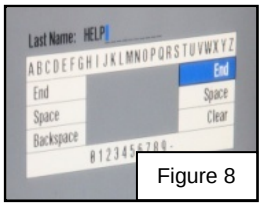


Figure 8

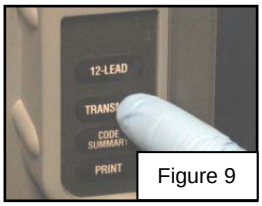


Figure 9

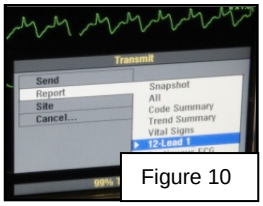


Figure 10

Figure 11

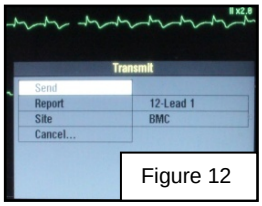


Figure 12

Protocol 5B: Acquiring &Transmitting 12–Lead ECGs – Adult & Pediatric, cont.

NOTE: There are limitations with transmitting data by telecommunications. Successful transmission depends on the access to public or private network services that may or may not always be available. This is especially true for cellular communication that is influenced by many factors, such as:

- Geography
- Location
- Weather
- Cellular service activity load (volume of active users)
- Cellular service availability

Treatment protocols take into account the fact that data transmissions cannot be assured with the use of cellular communications. Therefore early voice communication with the receiving facility is an essential contingency plan for interrupted data transmissions.

Multiple methods of transmitting 12-Lead ECG data exist (proprietary cellular/satellite network systems, data fax transmission, cellular transmission of images, e.g. photographs of the 12-Lead ECG sent via Smartphone). Check with local EMS administration officials and medical oversight physician(s) to ensure local practices are understood and follow all applicable laws relating to protected health information.

Special Note:

This protocol utilizes the Physio-Control LifePak®15 to illustrate one method of 12-lead ECG acquisition and transmission. The Oklahoma State Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the Physio-Control LifePak®15 for 12-lead ECG acquisition and transmission by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in 12-lead acquisition and transmission if not using the Physio-Control LifePak®15.

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5B – Acquiring & Transmitting 12-Lead ECGs – Adult& Pediatric

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2. Werman HA, Newland R, Cotton B. Transmission of 12-lead electrocardiographic tracings by Emergency Medical Technician-Basics and Emergency Medical Technician-Intermediates: a feasibility study. Am J Emerg Med. 2011 May;29(4):437-40.
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5C - ACUTE CORONARY SYNDROME ADULT

TREATMENT PRIORITIES

3 in 5 minutes of patient contact:
1. Vital signs
2. O_2 if indicated
3. ECG rhythm (if paramedic present)

5 in 10 minutes of patient contact:
1. ASA
2. IV
3. 12 lead ECG
4. NTG or fluids (BP/Inf. MI?)
5. Repeat vital signs

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
ADVISE ASPIRIN (ASA) 324/325 mg CHEWED BY PT
(unless contraindicated).
ADVISE NITROGLYCERIN (NTG)
PT SELF-ADMINISTRATION
IF PREVIOUSLY PRESCRIBED FOR SIMILAR SYMPTOMS

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC or NRB IF DYSPNEA or PULSE OX <94% AT ROOM AIR
APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (if equipped)
TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT
ASA 324/325 mg CHEWED BY PT (hold if taken < 6 hours or contraindicated)
ASSIST NTG SELF-ADMINISTRATION 0.4mg (hold if Sys BP ≤ 100 mmHg)

EMT-I85 / AEMT

IV ACCESS
IV NS TKO if SYS BP > 100 mmHg
IV NS 250 mL BOLUS if SYS BP ≤ 100 mmHg IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

TREAT ANY CARDIAC DYSRHYTHMIAS/SHOCK BY THE RESPECTIVE PROTOCOLS
ANALYZE 12-LEAD ECG – TREAT PER FOLLOWING FLOWCHART
NOTIFY RECEIVING HOSPITAL IMMEDIATELY IF SUSPECTED STEMI
TRANSPORT ASAP PER DESTINATION PROTOCOL

*ACUTE INFERIOR INFARCT?
- YES → OBTAIN/ANALYZE RIGHT-SIDED 12-LEAD ECG ENROUTE
- NO → SYS BP > 100 mmHg?

**ACUTE RIGHT VENTRICULAR INFARCT?
- NO → SYS BP > 100 mmHg?
- YES → IF SYS BP < 120 mmHg, IV NS 250 mL BOLUS IF NO SIGNS OF PULMONARY EDEMA

SYS BP > 100 mmHg?
- YES → *** NTG 0.4 mg SL. MAY REPEAT EVERY 5 MIN IF SYS BP > 100 mmHg
- NO → SIGNS OF PULMONARY EDEMA?

SIGNS OF PULMONARY EDEMA?
- NO → IV NS 250 mL BOLUS REPEAT UNTIL SYS BP > 100 mmHg IF NO SIGNS OF PULMONARY EDEMA
- YES → DOPAMINE IVPB 5-20 mcg/kg/min TITRATE TO SYS BP > 100 mmHg

IF PT STILL HAVING ACS SYMPTOMS AFTER 3 NTG ADMINISTRATIONS
WITH PERSISTENT CHEST PAIN & IF SYS BP > 100 mmHg:
ADDITIONAL NITROGLYCERIN PER PROTOCOL 16F
AND
MORPHINE SULFATE 2 mg SLOW IVP, MAY REPEAT EVERY 5 MIN TO A TOTAL OF 10 mg.
OR
FENTANYL 0.5 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 50 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 1.5 mcg/kg or 125 mcg WHICHEVER IS LESSER.
OR
HYDROMORPHONE 0.25 mg SLOW IVP .
MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 1 mg.

* ACUTE INFERIOR INFARCT INDICATED BY ST SEGMENT ELEVATION IN AT LEAST 2 OF THESE 3 LEADS: II, III, aVF.

**ACUTE RIGHT VENTRICULAR INFARCT INDICATED BY ST SEGMENT ELEVATION IN AT LEAST 2 OF THESE 4 LEADS: V3R, V4R, V5R, V6R.

***DO NOT GIVE NTG TO PATIENTS TAKING VIAGRA® OR LEVITRA® WITHIN 24 HOURS OR CIALIS® WITHIN 48 HOURS WITHOUT OLMC CONSULT.

Medical Literature References
5C – Acute Coronary Syndromes – Adult

1. Verbeek PR, Ryan D, Turner L, Craig AM.Serial prehospital 12-lead electrocardiograms increase identification of ST-segment elevation myocardial infarction.PrehospEmerg Care. 2012 Jan;16(1):109-14.
2. Mathews R, Peterson ED, Li S, Roe MT, Glickman SW, Wiviott SD, Saucedo JF, Antman EM, Jacobs AK, Wang TY.Use of emergency medical service transport among patients with ST-segment-elevation myocardial infarction: findings from the National Cardiovascular Data Registry Acute Coronary Treatment Intervention Outcomes Network Registry-Get With The Guidelines.Circulation. 2011 Jul 12;124(2):154-63.
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4. Werman HA, Newland R, Cotton B.Transmission of 12-lead electrocardiographic tracings by Emergency Medical Technician-Basics and Emergency Medical Technician-Intermediates: a feasibility study.Am J Emerg Med. 2011 May;29(4):437-40.
5. Kontos MC, Diercks DB, Ho PM, Wang TY, Chen AY, Roe MT.Treatment and outcomes in patients with myocardial infarction treated with acute β-blocker therapy: results from the American College of Cardiology's NCDR(®).Am Heart J. 2011 May;161(5):864-70.
6. O'Connor RE, Brady W, Brooks SC, Diercks D, Egan J, Ghaemmaghami C, Menon V, O'Neil BJ, Travers AH, Yannopoulos D. Part 10: acute coronary syndromes: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S787–S817.
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8. Trivedi K, Schuur JD, Cone DC.Can paramedics read ST-segment elevation myocardial infarction on prehospital 12-lead electrocardiograms?PrehospEmerg Care. 2009 Apr-Jun;13(2):207-14.
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5D - BRADYCARDIA ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Vital Signs
2. IV Access
3. Analyze rhythm
4. Rhythm specific treatment.

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES)

EMR | **EMT**

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC or NRB IF DYSPNEA OR PULSE OX < 94% AT ROOM AIR
APPLY CARDIAC MONITOR/OBTAIN 12 – LEAD ECG (if equipped)
TRANSMIT 12 – LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT

UNSTABLE (SYMPTOMATIC) bradycardia is defined by any of the following symptoms:

1. Dyspnea
2. Chest pain
3. Weakness
4. Altered mental status
5. Hypoxemia
6. Pulmonary edema

EMT-I85 | **AEMT**

IV ACCESS

PARAMEDIC

ANALYZE & TREAT PER RHYTHM FLOWCHART BELOW
TRANSPORT ASAP PER DESTINATION PROTOCOL

SINUS BRADYCARDIA
FIRST DEGREE AV BLOCK
SECOND DEGREE AV BLOCK, TYPE I (WENCKEBACH)

SECOND DEGREE AV BLOCK, TYPE II (CLASSIC)
THIRD DEGREE AV BLOCK (COMPLETE)

ADULT & PEDIATRIC: ASYMPTOMATIC – MONITOR ONLY.
ADULT: TREAT IF SYMPTOMATIC AND SYS B/P < 100mmHg.
PEDIATRIC: TREAT IF SYMPTOMATIC AND SYS B/P < (70 + 2x age in years) mmHg.
ADULT: ACS – TREAT PER PROTOCOL 5C - ACUTE CORONARY SYNDROME. AVOID ATROPINE IF HR >40 bpm.
ADULT: NON-ACS – ATROPINE 0.5 mg IVP/IOP. MAY REPEAT EVERY 5 MINUTES TO CUMULATIVE OF 3 mg.
PEDIATRIC: EPINEPHRINE 0.01 mg/kg IVP/IOP. (1:10,000 0.1 mL/kg IVP/IOP). MAY REPEAT ONCE.
IF UNRESPONSIVE TO EPINEPHRINE, ATROPINE 0.02 mg/kg IVP/IOP. MINIMUM DOSE 0.1 mg. MAX SINGLE DOSE 0.5 mg. MAY REPEAT ONCE.

ADULT & PEDIATRIC: ASYMPTOMATIC – MONITOR & PLACE PACING PADS.
ADULT: ACS – TREAT PER PROTOCOL 5C - ACUTE CORONARY SYNDROME & PACE AT 60 bpm INSTEAD OF ATROPINE USE.
ADULT: NON-ACS – PACE AT 60 bpm INSTEAD OF ATROPINE USE.
PEDIATRIC: PLACE PACER PADS. CONSULT OLMCP.

Medical Literature References
5D - Bradycardia – Adult & Pediatric

1. Link MS, Atkins DL, Passman RS, Halperin HR, Samson RA, White RD, Cudnik MT, Berg MD, Kudenchuk PJ, Kerber RE. Part 6: electrical therapies: automated external defibrillators, defibrillation, cardioversion, and pacing: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S706–S719.
2. Neumar RW, Otto CW, Link MS, Kronick SL, Shuster M, Callaway CW, Kudenchuk PJ, Ornato JP, McNally B, Silvers SM, Passman RS, White RD, Hess EP, Tang W, Davis D, Sinz E, Morrison LJ. Part 8: adult advanced cardiovascular life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S729–S767.
3. O'Connor RE, Brady W, Brooks SC, Diercks D, Egan J, Ghaemmaghami C, Menon V, O'Neil BJ, Travers AH, Yannopoulos D. Part 10: acute coronary syndromes: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S787–S817.
4. Kleinman ME, Chameides L, Schexnayder SM, Samson RA, Hazinski MF, Atkins DL, Berg MD, de Caen AR, Fink EL, Freid EB, Hickey RW, Marino BS, Nadkarni VM, Proctor LT, Qureshi FA, Sartorelli K, Topjian A, van der Jagt EW, Zaritsky AL. Part 14: pediatric advanced life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S876–S908.
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5E – TRANSCUTANEOUS PACING ADULT & PEDIATRIC

EMT-PARAMEDIC

Indications:

1. Symptomatic 2nd Degree AV Block-Type II (Classic);
2. Symptomatic 3rd Degree AV Block (Complete);
3. Symptomatic Bradycardia in Acute Coronary Syndrome in preference to atropine use;
4. Symptomatic Bradycardia unresponsive to non-electrical interventions;
5. Symptomatic Bradycardia in pediatric patients (when approved by OLMCP consultation).

Contraindications:

1. Asymptomatic Bradycardia

Technique:
(Physio-Control LifePak® 15 – see protocol Special Note):

1. Maintain standard ECG monitoring using electrodes/cable.

2. Apply Quik–Combo™pads at chest wall location illustrated on the individual pad (Figure 1). Excessive diaphoresis may require drying and/or excessive chest hair may require partial removal to achieve appropriate pad-chest wall adhesion.

3. Connect Quik-Combo™ pad set to LifePak® monitor/defibrillator via attached cable.

4. Advise patient of impending therapy. Administer sedation if patient condition allows, adults to receive 2-5mg midazolam IVP as individual patient weight and hemodynamics dictate.

5. Power on the pacing function by pressing the "PACER" button (Figure 2).

6. Confirm ECG rhythm is sensed by Quik-Combo™ pads, looking for triangular "sense markers" marking QRS complexes (Figure3). If sense markers do not appear, check for correct Quik-Combo™ pad attachment to LifePak monitor/defibrillator. If sense markers are inconsistently tracking QRS complexes and/or tracking T waves, adjust ECG size or select alternate monitoring lead to achieve correct QRS complex tracking.

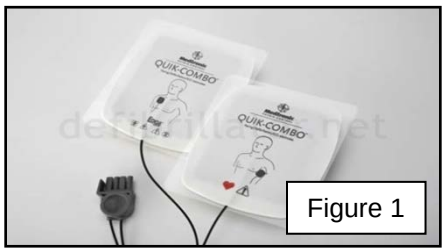

Figure 1

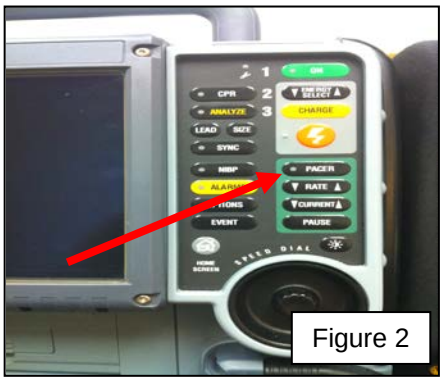

Figure 2

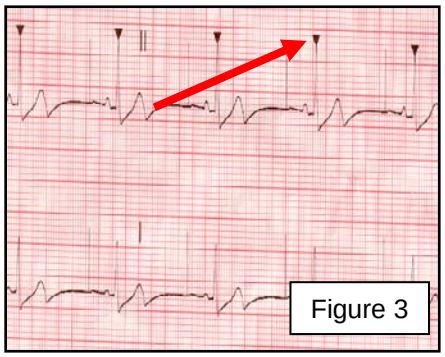
Figure 3

PROTOCOL 5E: Transcutaneous Pacing, Adult & Pediatric, cont.

Technique (cont):

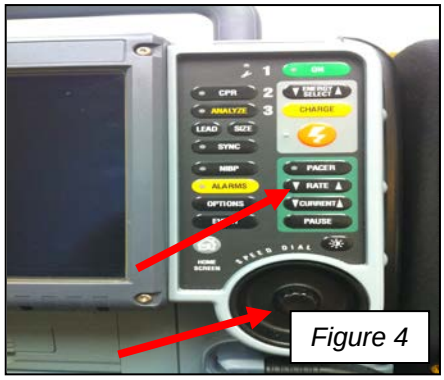

Figure 4

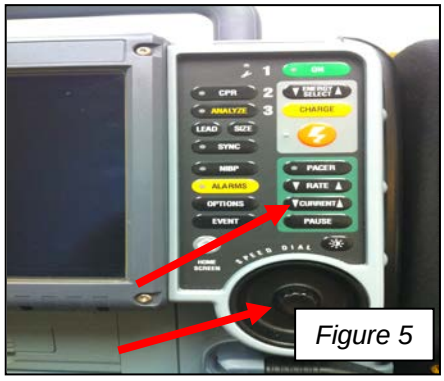

Figure 5

7. Set pacing **rate** at 60 paces per minute (adults) either by pressing the "RATE" switch up arrow to increase rate or down arrow to decrease rate or by rotating the "SPEED DIAL" knob (Figure 4). The "RATE" switch will allow changes in 10 paces per minute increments; the "SPEED DIAL" knob will allow changes in 5 paces per minute increments.

8. Set pacing **current** at minimum level achieving electrical AND mechanical capture. Deliver electrical pacing current either by pressing the "CURRENT" switch up arrow to increase milliAmp (mA) current or down arrow to decrease mA current or by rotating the "SPEED DIAL" knob (Figure 5). The "CURRENT" switch will allow changes in 10 mA increments; the "SPEED DIAL" knob will allow changes in 5 mA increments.

9. Pressing the "PAUSE" button will cause the set pacing rate to decrease by 25% (eg. rate of 60 paces per minute changes to rate of 45 paces per minute) while it is being depressed. This function should not be used without directive from OLMC.

10. If pacing therapy termination is required, power off the pacing function by pressing the "PACER" button (Figure 2).

Pacing-Related Considerations:
(Physio-Control LifePak® 15 – see protocol Special Note):

1. In the event of ventricular fibrillation or pulseless ventricular tachycardia, pressing the yellow "CHARGE" button will automatically stop the pacing function. Proceed with defibrillation.

2. If the monitor displays "**ECG LEAD OFF"** during transcutaneous pacing, pacing automatically switches to non – demand and continues at the fixed rate until the ECG lead(s) is reattached. During non – demand pacing, the pacemaker delivers pulses at the set pace rate regardless of any intrinsic beats that the patient may have. The monitor continues to display the pacing rate and the current. To reestablish demand pacing, reattach the ECG lead(s).

3. If the Quik-Combo™ electrodes detach during pacing, the monitor will display "**CONNECT ELECTRODES"** and "**PACING STOPPED"** messages and sound an alarm. The set pacing rate is maintained, but the current resets to 0 mA. Reattaching the Quik-Combo™ electrodes silences the alarm and removes the messages. The current remains at 0 mA until manually adjusted as described above.

PROTOCOL 5E: Transcutaneous Pacing, Adult & Pediatric, cont.

Pacing-Related Considerations (cont):

4. Proper electrical capture is displayed by depolarization of the ventricles, reflected as a wide QRS, followed by a distinct, broad T wave (Figures 6 & 7). Absence of these findings immediately following pacing spikes generally indicates failure of consistent electrical and mechanical capture (Figures 8 & 9).

5. With transcutaneous pacing, it may be difficult to see the paced QRS complex due to washout from the pacing stimulus. It is imperative to confirm capture by a physiologic measure such as a pulse.

Figure 6

Figure 7

Figure 8

Figure 9

Special Note:

This protocol utilizes the Physio-Control LifePak®15 to illustrate one method of performing transcutaneous pacing. The Oklahoma Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the Physio-Control LifePak® 15 for transcutaneous pacing by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in transcutaneous pacing if not using the Physio-Control LifePak® 15.

Medical Literature References
5E – Transcutaneous Pacing – Adult & Pediatric

1. Link MS, Atkins DL, Passman RS, Halperin HR, Samson RA, White RD, Cudnik MT, Berg MD, Kudenchuk PJ, Kerber RE. Part 6: electrical therapies: automated external defibrillators, defibrillation, cardioversion, and pacing: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S706–S719.
2. Neumar RW, Otto CW, Link MS, Kronick SL, Shuster M, Callaway CW, Kudenchuk PJ, Ornato JP, McNally B, Silvers SM, Passman RS, White RD, Hess EP, Tang W, Davis D, Sinz E, Morrison LJ. Part 8: adult advanced cardiovascular life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S729–S767.
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6. Cummins RO, Graves JR, Larsen MP, Hallstrom AP, Hearne TR, Ciliberti J, Nicola RM, Horan S.Out-of-hospital transcutaneous pacing by emergency medical technicians in patients with asystolic cardiac arrest.N Engl J Med. 1993 May 13;328(19):1377-82.

5F TACHYCARDIA - STABLE ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES

1. Vital signs
2. IV Access
3. Analyze rhythm
4. Rhythm specific treatment
5. Consult OLMC for pediatric pts
6. If protocol measures DO NOT control rate of adult PSVT, or convert WIDE COMPLEX TACHYCARDIA, **CONTACT OLMC**
7. OLMC Adult options include:

Narrow Complex Tachycardia
- DILTIAZEM 0.25 mg/kg SLOW IVP over 2 mins
- AMIODARONE 150mg SLOW IVP/IVPB over 10 mins
- **SYNCHRONIZED** CARDIOVERSION
- MONITOR/TRANSPORT

Wide Complex Tachycardia
- Repeat AMIODARONE 150mg SLOW IVP/IVPB over 10 mins
- **SYNCHRONIZED** CARDIOVERSION
- ADENOSINE 12 mg RAPID IVP IF REGULAR & MONOMORPHIC
- LIDOCAINE up to 1 mg/kg IVP at < 50 mg/min
- MONITOR/TRANSPORT

UNSTABLE (SYMPTOMATIC) tachycardia is defined by any of the following symptoms:

1. Dyspnea
2. Chest pain
3. Weakness
4. Altered mental status
5. Hypoxemia
6. Pulmonary edema

EMD

ADVISE TO AVOID PHYSICAL EXERTION OR ENVIRONMENTAL STRESS (TEMP EXTREMES).

EMR | **EMT**

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC or NRB IF DYSPNEA OR PULSE OX < 94% AT ROOM AIR
APPLY CARDIAC MONITOR/OBTAIN 12 – LEAD ECG (if equipped)
TRANSMIT 12 – LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT

EMT-I85 | **AEMT**

IV ACCESS

PARAMEDIC

ADULT: ANALYZE & TREAT PER FLOWCHART BELOW
PEDIATRIC: CONSULT OLMC FOR TREATMENT PLAN
TRANSPORT ASAP PER DESTINATION PROTOCOL

ADULT HEART RATE ≥ 150/MIN?
AFEBRILE PEDIATRIC HEART RATE ≥ 180/MIN?

NO → TREATMENT PER OTHER APPLICABLE PROTOCOLS

YES →

UNSTABLE WITH SYMPTOMS **AND**
ADULT: SYS BP <100 mmHg?
PEDIATRIC: SYS BP < (70 + 2x age in years) mmHg?

YES → TREAT PER PROTOCOL 5G UNSTABLE TACHYCARDIA

NO →

ATRIAL FIBRILLATION **OR** ATRIAL FUTTER → OBSERVE

PSVT → VALSALVA MANUEVER → ADENOSINE 6 **OR**12 mg RAPID IVP **MAY REPEAT AT 12 MG**

WIDE – COMPLEX TACHYCARDIA UNCERTAIN TYPE **OR** MONOMORPHIC VENTRICULAR TACHYCARDIA → AMIODARONE 150 mg OVER 10 MINUTES (**VERY SLOW** IVP/IVPB)

TORSADES → MAGNESIUM SULFATE 1 gram SLOW IVP/IOP OVER 1 MINUTE MAY REPEAT X1

Medical Literature References
5F – Tachycardia - Stable – Adult & Pediatric

1. Link MS, Atkins DL, Passman RS, Halperin HR, Samson RA, White RD, Cudnik MT, Berg MD, Kudenchuk PJ, Kerber RE. Part 6: electrical therapies: automated external defibrillators, defibrillation, cardioversion, and pacing: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S706–S719.
2. Neumar RW, Otto CW, Link MS, Kronick SL, Shuster M, Callaway CW, Kudenchuk PJ, Ornato JP, McNally B, Silvers SM, Passman RS, White RD, Hess EP, Tang W, Davis D, Sinz E, Morrison LJ. Part 8: adult advanced cardiovascular life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S729–S767.
3. O'Connor RE, Brady W, Brooks SC, Diercks D, Egan J, Ghaemmaghami C, Menon V, O'Neil BJ, Travers AH, Yannopoulos D. Part 10: acute coronary syndromes: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S787–S817.
4. Kleinman ME, Chameides L, Schexnayder SM, Samson RA, Hazinski MF, Atkins DL, Berg MD, de Caen AR, Fink EL, Freid EB, Hickey RW, Marino BS, Nadkarni VM, Proctor LT, Qureshi FA, Sartorelli K, Topjian A, van der Jagt EW, Zaritsky AL. Part 14: pediatric advanced life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S876–S908.
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6. Riccardi A, Arboscello E, Ghinatti M, Minuto P, Lerza R.Adenosine in the treatment of supraventricular tachycardia: 5 years of experience (2002-2006).Am J Emerg Med. 2008 Oct;26(8):879-82.
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5G TACHYCARDIA - UNSTABLE ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES

1. Vital signs
2. IV Access
3. Analyze rhythm
4. Rhythm specific treatment
5. Synchronized mode utilized each synchronized cardioverstion
6. Consult OLMC for pediatric pts
7. If protocol measures DO NOT convert rhythm, control symptoms, and restore blood pressure, **CONTACT OLMC**

UNSTABLE (SYMPTOMATIC) tachycardia is defined by any of the following symptoms:

1. Dyspnea
2. Chest pain
3. Weakness
4. Altered mental status
5. Hypoxemia
6. Pulmonary edema

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).

EMR | **EMT**

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC or NRB IF DYSPNEA or PULSE OX <94% AT ROOM AIR
APPLY CARDIAC MONITOR/OBTAIN 12 – LEAD ECG (if equipped)
TRANSMIT 12 – LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT

EMT-I85 | **AEMT**

IV ACCESS

PARAMEDIC

ADULT: ANALYZE & TREAT PER FLOWCHART BELOW
PEDIATRIC: CONSULT OLMC FOR TREATMENT PLAN (MEDICATION OR ELECTRICAL THERAPY)
TRANSPORT ASAP PER DESTINATION PROTOCOL

ADULT: HEART RATE **>** 150/MIN?
PEDIATRIC: AFEBRILE HEART RATE > 180/MIN?

NO → TREATMENT PER APPLICABLE PROTOCOLS

YES ↓

UNSTABLE WITH SYMPTOMS **AND**
ADULT: SYS BP <100 mmHg?
PEDIATRIC: SYS BP < (70 + 2x age in years) mmHg

NO → TREAT PER PROTOCOL 5F TACHYCARDIA - STABLE

YES ↓

SYNCHRONIZED CARDIOVERSION
DOUBLE CHECK PRIOR TO EACH AND EVERY SYNCHRONIZED CARDIOVERSION
ASSURE "SYNC" MODE IS UTILIZED PRIOR TO ENERGY DELIVERY

ADULT: IF SYS BP > 80 mmHg, PRETREAT WITH MIDAZOLAM 0.1 mg/kg IVP/IOP/INP, Maximum dose 5 mg

BEGIN AT **100J SYNCHRONIZED** IF RHYTHM PERSISTS & PATIENT REMAINS UNSTABLE REPEAT AT **SYNCHRONIZED** ENERGY SETTINGS OF **200J, 300J, 360J**

TACHYCARDIA RESOLVES?

NO → CONSULT OLMC

YES ↓

ADULT: VENTRICULAR TACHYCARDIA ONLY
AMIODARONE
150 mg OVER 10 MINUTES **VERY SLOW** IVP/IVPB

Medical Literature References
5G – Tachycardia - Unstable – Adult & Pediatric

1. Ong ME, Pellis T, Link MS. The use of antiarrhythmic drugs for adult cardiac arrest: a systematic review. Resuscitation. 2011 Jun;82(6):665-70.
2. Link MS, Atkins DL, Passman RS, Halperin HR, Samson RA, White RD, Cudnik MT, Berg MD, Kudenchuk PJ, Kerber RE. Part 6: electrical therapies: automated external defibrillators, defibrillation, cardioversion, and pacing: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S706–S719.
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7. Somberg JC, Bailin SJ, Haffajee CI, Paladino WP, Kerin NZ, Bridges D, Timar S, Molnar J; Amio-Aqueous Investigators. Intravenous lidocaine versus intravenous amiodarone (in a new aqueous formulation) for incessant ventricular tachycardia. Am J Cardiol. 2002 Oct 15;90(8):853-9.

5H – SYNCHRONIZED CARDIOVERSION ADULT & PEDIATRIC

PARAMEDIC

Indication:

Unstable, symptomatic tachycardia (adult heart rate > 150 beats per minute; afebrile pediatric heart rate > 180 beats per minute) AND hemodynamic compromise adult systolic blood pressure <100 mmHg; pediatric systolic blood pressure < (70 + 2x age in years) mmHg.

Contraindications:

1. Stable tachycardia (Treatment per Protocol 5F – Stable Tachycardia).
2. Normal sinus rhythms.
3. Bradycardia.
4. Ventricular fibrillation/pulseless ventricular tachycardia.

Technique (Physio-Control LifePak® 15 – see protocol Special Note):

1. Power **ON**. (Figure 1)

2. Attach patient ECG cable and ECG electrodes. ECG electrodes and cable must be used to monitor the ECG when paddles are used for synchronized cardioversion.

3. Select lead with the greatest QRS complex amplitude positive or negative deflection. (Figure 2)

4. Press **SYNC**. The **SYNC MODE** message appears in the message area when **SYNC** is active. (Figure 3)
    a. **NOTE:** To deactivate **SYNC MODE** when not synchronized cardioverting, press **SYNC** again.

Figure 1

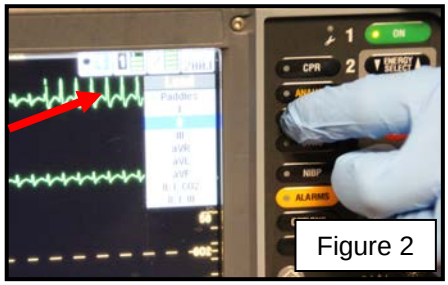


Figure 2

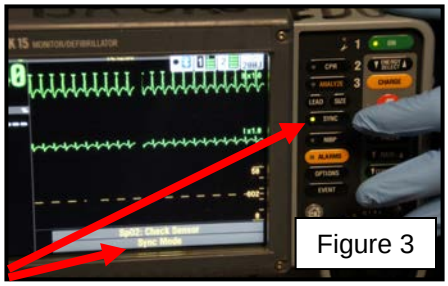


Figure 3

Protocol 5H: Synchronized Cardioversion, Adult & Pediatric, cont.

Technique (cont):

5. Observe the ECG rhythm. Confirm that a triangle sense marker (▼) appears near the MIDDLE of each QRS complex. (Figure 4)
    a. If the sense markers **DO NOT** appear or are displayed in the wrong location **(for example on the T – wave)** adjust **ECG SIZE** or select another lead. It is normal for the sense marker location to vary *slightly* on each QRS.

6. Connect the therapy electrodes to the therapy cable and confirm cable connection to the monitor/defibrillator. (Figure 5)

7. Prepare the patient's skin and apply therapy electrodes to the patient in the anterior-lateral position. (Figure 6)

8. Press **ENERGY SELECT** or rotate the **SPEED DIAL** to select the desired energy. (Figure 7) Per Protocol 5G – Tachycardia – Unstable, for adult synchronized cardioversion, begin at 100 joules energy. If unstable tachydysrhythmia persists, repeat synchronized cardioversion at escalating energy settings of 200 joules, 300 joules, 360 joules. For pediatric synchronized cardioversion, consult on-line medical control for treatment plan and energy settings.

9. Press **CHARGE**. While the monitor/defibrillator is charging a charging bar appears and a ramping tone sounds, indicating the charging energy level. When the monitor/defibrillator is fully charged, the screen displays available energy. (Figure 8)

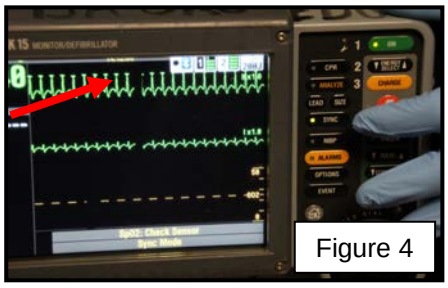


Figure 4

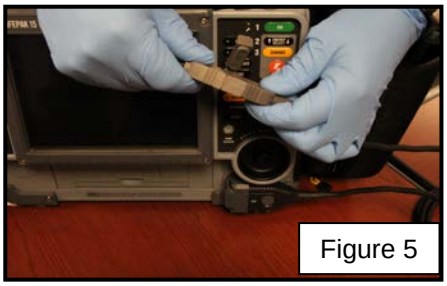
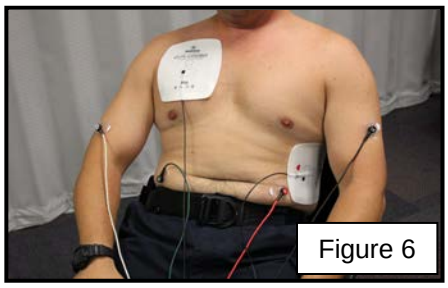


Figure 5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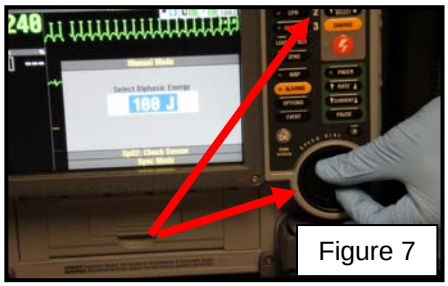
Figure 7

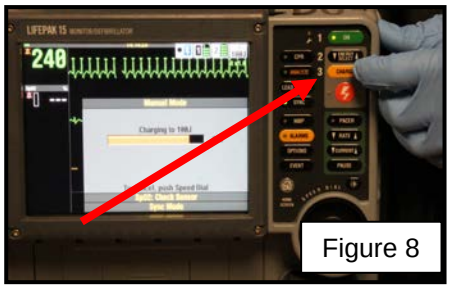
Figure 8

Protocol 5H: Synchronized Cardioversion, Adult & Pediatric, cont.

Technique (cont):

10. Make certain all personnel, including the operator, stand clear of the patient, bed, and any equipment connected to the patient.

11. Confirm ECG rhythm. Confirm available energy. *Prior to delivering synchronized cardioversion, it is paramount to ensure that the **SYNC MODE** message continues to appear. Failure to deliver a "synchronized" cardioversion in this setting could cause ventricular fibrillation cardiac arrest in the patient.* (Figure 9)

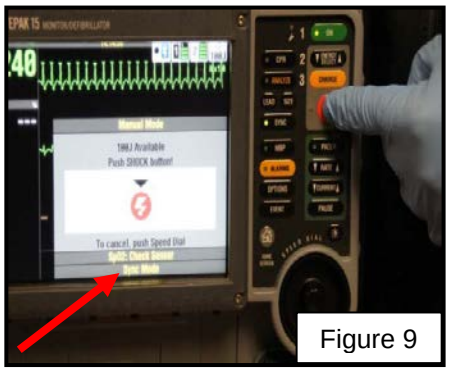

Figure 9

12. Press and hold the (shock) button on the monitor/defibrillator until the **ENERGY DELIVERED** message appears on the screen. (Figure 10)
    a. **NOTE:** To disarm (cancel the charge), press the SPEED DIAL. The energy disarms automatically if shock buttons are not pressed within 60 seconds, or if the energy selection after charging begins.

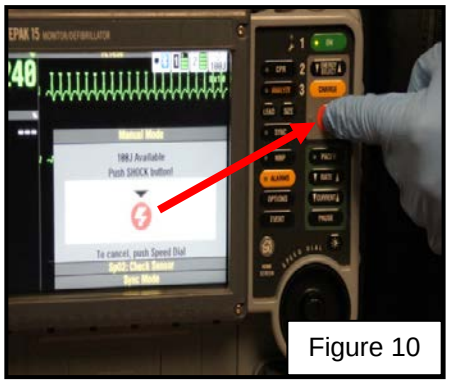

Figure 10

13. Observe patient and ECG rhythm. Repeat procedure starting from Step 4, if necessary.

Special Note:

This protocol utilizes the Physio-Control LifePak® 15 to illustrate one method of performing synchronized cardioversion. The Oklahoma State Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the Physio-Control LifePak® 15 for synchronized cardioversion by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in synchronized cardioversion if not using the Physio-Control LifePak® 15.

Medical Literature References
5H – Synchronized Cardioversion – Adult & Pediatric

1. Link MS, Atkins DL, Passman RS, Halperin HR, Samson RA, White RD, Cudnik MT, Berg MD, Kudenchuk PJ, Kerber RE. Part 6: electrical therapies: automated external defibrillators, defibrillation, cardioversion, and pacing: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S706–S719.
2. Neumar RW, Otto CW, Link MS, Kronick SL, Shuster M, Callaway CW, Kudenchuk PJ, Ornato JP, McNally B, Silvers SM, Passman RS, White RD, Hess EP, Tang W, Davis D, Sinz E, Morrison LJ. Part 8: adult advanced cardiovascular life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S729–S767.
3. Kleinman ME, Chameides L, Schexnayder SM, Samson RA, Hazinski MF, Atkins DL, Berg MD, de Caen AR, Fink EL, Freid EB, Hickey RW, Marino BS, Nadkarni VM, Proctor LT, Qureshi FA, Sartorelli K, Topjian A, van der Jagt EW, Zaritsky AL. Part 14: pediatric advanced life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S876–S908.
4. Marill KA, deSouza IS, Nishijima DK, Stair TO, Setnik GS, Ruskin JN. Amiodarone is poorly effective for the acute termination of ventricular tachycardia. Ann Emerg Med. 2006 Mar;47(3):217-24.
5. Slovis CM, Kudenchuk PJ, Wayne MA, Aghababian R, Rivera-Rivera EJ.Prehospital management of acute tachyarrhythmias.PrehospEmerg Care. 2003 Jan-Mar;7(1):2-12.
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5I - PACEMAKER MANAGEMENT ADULT & PEDIATRIC

PARAMEDIC

Clinical Pearls:

1. Correlate electrical pacing activity with mechanical heart activity (eg. pulses).

2. If electrical pacer spikes seen on the ECG monitor are not consistently and immediately followed by electrical activity of atrial, ventricular, or both atrial and ventricular depolarization, then the pacemaker may be intermittently functioning. This may be normal if the patient's heart rate is above 60 beats per minute, since most pacemakers will be set to a demand mode (pacing only when needed). Alternately, if the patient is bradycardic, the pacemaker may be non-functional (eg. battery failure).

3. The "sensor function" of a pacemaker attempts to anticipate increased metabolic needs and raises heart rate. The most commonly used sensor is an accelerometer which raises pacing rate when motion is detected. Thus, physical motion of the patient (including motion created by riding on the ambulance stretcher enroute to the hospital) can stimulate increasing rates of pacing. If the paced rate is noticeably higher than usual set rates of 60-80 beats per minute, attempt to minimize the patient's physical motion and observe if pacing rates decline.

4. Due to the variety of pacemaker types and settings, pacemaker manufacturers supply patients with a card to be carried (usually in wallet or purse) that identifies the pacemaker by manufacturer, type, and date of implantation.

5. Specific types of pacemaker malfunction include the following:
   a. Failure to pace/output – no pacing spikes seen in a bradycardic patient. (example, oversensing of myopotentials, dead battery)
   b. Failure to sense – pacing becomes asynchronous (example, patient's heart voltage too low for pacer to sense)
   c. Failure to capture – pacing spikes seen without capture (examples, lead becomes dislodged from myocardium or breaks)
   d. Overpacing or "runaway pacing" – pacemaker pacing at fast rates without clear reason (examples, sensor-driven pacing from motion, pacemaker-mediated tachycardia)

6. In the setting of sustained, symptomatic rapid pacing suspected to be related to overpacing (see Item 4 above), tachycardia may be able to be controlled by placing a doughnut-shaped medical magnet over the generator.

7. In the setting of cardiac arrest, treat per usual resuscitation, but avoid placing defibrillation pads over the pacemaker generator.

8. **Consult on-line medical control early in the course of suspected pacemaker management issues for further guidance.**

Medical Literature References
5I – Pacemaker Management – Adult & Pediatric

1. Protocol expert consultant: David Sandler, MD. Oklahoma Heart Institute, Tulsa. Board certified in clinical cardiac electrophysiology, cardiovascular disease, and internal medicine by the American Board of Internal Medicine.
2. Rajanahally RS, Thomas JT. Chapter 23. Pacemaker Assessment. In: Reichman EF, Simon RR, eds. Emergency Medicine Procedures. New York: McGraw-Hill; 2004. http://www.accessemergencymedicine.com/content.aspx?aID=48460. Accessed June 29, 2012.
3. Piktel JS. Chapter 22. Cardiac Rhythm Disturbances. In: Tintinalli JE, Kelen GD, Stapczynski JS, eds. Tintinalli's Emergency Medicine: A Comprehensive Study Guide. 7th ed. New York: McGraw-Hill; 2011. http://www.accessemergencymedicine.com/content.aspx?aID=6357092. Accessed June 29, 2012.
4. Link MS, Atkins DL, Passman RS, Halperin HR, Samson RA, White RD, Cudnik MT, Berg MD, Kudenchuk PJ, Kerber RE. Part 6: electrical therapies: automated external defibrillators, defibrillation, cardioversion, and pacing: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S706–S719.
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7. McMullan J, Valento M, Attari M, Venkat A.Care of the pacemaker/implantable cardioverter defibrillator patient in the ED.Am J Emerg Med. 2007 Sep;25(7):812-22.

5J - IMPLANTABLE CARDIOVERTER/DEFIBRILLATOR (ICD) MANAGEMENT ADULT & PEDIATRIC

PARAMEDIC

Clinical Pearls:

1. Correlate ICD activity with ECG rhythm - ventricular fibrillation/tachycardia?

2. Due to the variety of ICDs, some with combined pacemakers, ICD manufacturers supply patients with a card to be carried (usually in wallet or purse) that identifies the ICD by manufacturer, type, and date of implantation.

3. Specific types of ICD malfunction include the following:
   a. Inappropriate ICD shocks – Patient is shocked without evidence of arrhythmia (examples, lead fracture, oversensing of t-waves)
   b. Failure to shock ventricular tachycardia/fibrillation - (examples, undersensing of small fibrillatory waves, slow ventricular tachycardia below the ICD's programmed VT zone)

4. If the patient is hemodynamically stable, acquire and transmit a 12-Lead ECG prior to attempting any change in ICD function.

5. In the setting of oversensing, especially if multiple apparently inappropriate ICD discharges occur, the ICD may be temporarily deactivated by placing a doughnut-shaped medical magnet over the ICD generator. Depending upon the exact model of ICD, a beep or sustained tone may be heard with successful magnet application.

6. While the magnet is applied to the ICD, no therapies will be delivered – even when needed for life-threatening arrhythmias. Therefore, PRIOR TO DEACTIVATING AN ICD WITH A MAGNET, THE PATIENT MUST BE ON CONTINUOUS ECG MONITORING AND A DEFIBRILLATOR MUST BE IMMEDIATELY AVAILABLE.

7. In the setting of cardiac arrest, treat per usual resuscitation, but avoid placing defibrillation pads over the ICD generator.

8. **Consult on-line medical control early in the course of suspected ICD management issues for further guidance.**

Medical Literature References
5J – Implantable Cardioverter/Defibrillator (AICD) Management – Adult & Pediatric

1. Protocol expert consultant: David Sandler, MD. Oklahoma Heart Institute, Tulsa. Board certified in clinical cardiac electrophysiology, cardiovascular disease, and internal medicine by the American Board of Internal Medicine.
2. Lee JK, Blossfield K. Chapter 24. Automatic Implantable Cardioverter-Defibrillator Assessment. In: Reichman EF, Simon RR, eds. Emergency Medicine Procedures. New York: McGraw-Hill; 2004. http://www.accessemergencymedicine.com/content.aspx?aID=48546. Accessed June 30, 2012.
3. Piktel JS. Chapter 22. Cardiac Rhythm Disturbances. In: Tintinalli JE, Kelen GD, Stapczynski JS, eds. Tintinalli's Emergency Medicine: A Comprehensive Study Guide. 7th ed. New York: McGraw-Hill; 2011. http://www.accessemergencymedicine.com/content.aspx?aID=6357092. Accessed June 29, 2012.
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8. Munter DW, DeLacey WA.Automatic implantable cardioverter-defibrillators.Emerg Med Clin North Am. 1994 Aug;12(3):579-95.

5K - PREMATURE VENTRICULAR CONTRACTIONS ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. O2 via NC or NRB if indicated
2. 12-Lead ECG
3. Rhythm Analysis

UNSTABLE (SYMPTOMATIC) premature ventricular contractions are defined by any of the following symptoms:

1. Dyspnea
2. Chest pain
3. Weakness
4. Altered mental status
5. Hypoxemia
6. Pulmonary edema

EMERGENCY MEDICAL DISPATCHER

EMERGENCY MEDICAL RESPONDER

EMT

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

PARAMEDIC

ASYMPTOMATIC PVCs DO NOT REQUIRE ANTI-DYSRHYTHMIC MEDICATION.

TREAT IF UNSTABLE WITH SYMPTOMS AND ADULT SYS BP < 100 mmHg
DO NOT PHARMACOLOGICALLY SUPPRESS PVCs IN 2nd / 3rd DEGREE HEART BLOCKS

ADULT: AMIODARONE 150mg VERY SLOW IVP/IVPB OVER 10 MINUTES.

PEDIATRIC: OLMC CONSULT

Medical Literature References
5K – Premature Ventricular Contractions – Adult & Pediatric

1. Omar AR, Lee LC, Seow SC, Teo SG, Poh KK. Managing ventricular ectopics: are ventricular ectopic beats just an annoyance? Singapore Med J. 2011 Oct;52(10):707-13.
2. Neumar RW, Otto CW, Link MS, Kronick SL, Shuster M, Callaway CW, Kudenchuk PJ, Ornato JP, McNally B, Silvers SM, Passman RS, White RD, Hess EP, Tang W, Davis D, Sinz E, Morrison LJ. Part 8: adult advanced cardiovascular life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S729–S767.
3. Kleinman ME, Chameides L, Schexnayder SM, Samson RA, Hazinski MF, Atkins DL, Berg MD, de Caen AR, Fink EL, Freid EB, Hickey RW, Marino BS, Nadkarni VM, Proctor LT, Qureshi FA, Sartorelli K, Topjian A, van der Jagt EW, Zaritsky AL. Part 14: pediatric advanced life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S876–S908.
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5. Marill KA, deSouza IS, Nishijima DK, Stair TO, Setnik GS, Ruskin JN. Amiodarone is poorly effective for the acute termination of ventricular tachycardia. Ann Emerg Med. 2006 Mar;47(3):217-24.
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5L - HYPERTENSIVE EMERGENCY ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Vital Signs
2. Perform Los Angeles Prehospital Stroke Scale Assessment
3. Do NOT treat asymptomatic HTN.
4. Do NOT reduce symptomatic HTN more than 10%.

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMR | **EMT**

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC or NRB IF DYSPNEA or PULSE OX <94% AT ROOM AIR
APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (if equipped)
TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT

EMT-I85 | **AEMT**

IV ACCESS

PARAMEDIC

DO NOT TREAT ASYMPTOMATIC HYPERTENSION OR HYPERTENSION IN SUSPECTED ACUTE STROKE.

ADULT: IF BP >240 mmHg SYS &/OR 120 mmHg DIA **AND** CHEST PAIN OR DYSPNEA:

LABETALOL 20 mg SLOW IVP
MAY REPEAT AT 40 mg EVERY 10 MINS UNTIL BP REDUCED 10% OR SYMPTOMS RESOLVED.
MAX CUMULATIVE DOSE OF 300 mg.
OR
HYDRALAZINE 10 mg SLOW IVP
MAY REPEAT AT 10 mg EVERY 30 MINS UNTIL BP REDUCED 10% OR SYMPTOMS RESOLVED
MAX CUMULATIVE DOSE OF 30 mg
OR
NITROGLYCERIN 0.4 mg SL (OR IV OR TRANSDERMAL OPTIONS PER PROTOCOL 16F)
MAY REPEAT EVERY 5 MINS UNTIL BP REDUCED 10% OR SYMPTOMS RESOLVED.
NITROGLYCERIN CONTRAINDICATED IF RECENT USE OF ERECTILE DYSFUNCTION MEDICATIONS
REFER TO PROTOCOLS 5C OR 16F

DO NOT REDUCE BP BEYOND 10%.

PEDIATRIC: OLMC CONSULT

Medical Literature References
5L – Hypertensive Emergency – Adult& Pediatric

1. Marik PE, Rivera R. Hypertensive emergencies: an update. CurrOpinCrit Care. 2011 Dec;17(6):569-80.
2. Baumann BM, Cline DM, Pimenta E. Treatment of hypertension in the emergency department. J Am SocHypertens. 2011 Sep-Oct;5(5):366-77.
3. Mayer SA, Kurtz P, Wyman A, Sung GY, Multz AS, Varon J, Granger CB, Kleinschmidt K, Lapointe M, Peacock WF, Katz JN, Gore JM, O'Neil B, Anderson FA; STAT Investigators. Clinical practices, complications, and mortality in neurological patients with acute severe hypertension: the Studying the Treatment of Acute hyperTension registry. Crit Care Med. 2011 Oct;39(10):2330-6.
4. Jauch EC, Cucchiara B, Adeoye O, Meurer W, Brice J, Chan Y-F, Gentile N, Hazinski MF. Part 11: adult stroke: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S818–S828.

5M – VENTRICULAR ASSIST DEVICE (VAD) MANAGEMENT ADULT

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

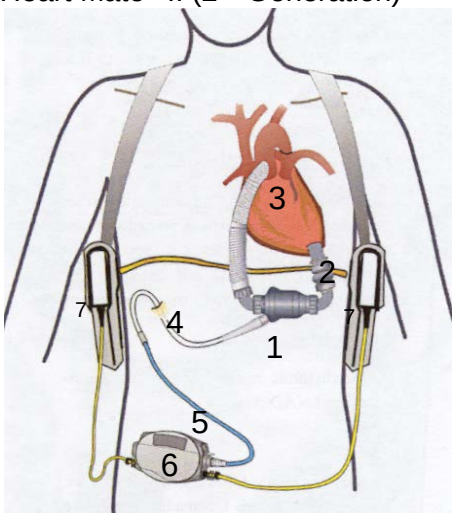
A **Ventricular Assist Device**, or **VAD**, is a mechanical device used to substantially support circulation in a patient with significant cardiac ventricular dysfunction. VADs may be placed for short term use of several weeks, such as in patients recovering from myocardial infarction or heart surgery. VADs may also be placed for long term use of months to remainder of life, such as in patients awaiting a heart transplant or suffering particularly severe congestive heart failure. A VAD is not a total artificial heart (TAH), which completely supports circulation in a patient whose heart has been removed.

VADs can assist either the right (RVAD) or left (LVAD) ventricle, or both at once (BiVAD). The choice of device depends on underlying heart disease and pulmonary arterial resistance. LVADs are more commonly used, but when pulmonary arterial resistance is high, right ventricular assist becomes necessary.

In Oklahoma, two VAD systems are currently in use. The Heart Mate® II (2nd generation VAD) uses a continuous flow pumping action to produce forward circulation. The Levacor® VAD (4th generation VAD) uses magnetic levitation technology to suspend the pump's rotor so that it does not make contact with the pump housing during operation. Second and fourth generation VADs are simpler in mechanism of flow, resulting in smaller VAD size and greater reliability. As with the second generation VAD **a patient utilizing a fourth generation VAD may not have a palpable pulse even though they are alive**. In other words, lack of a pulse does not equal death in these patients.

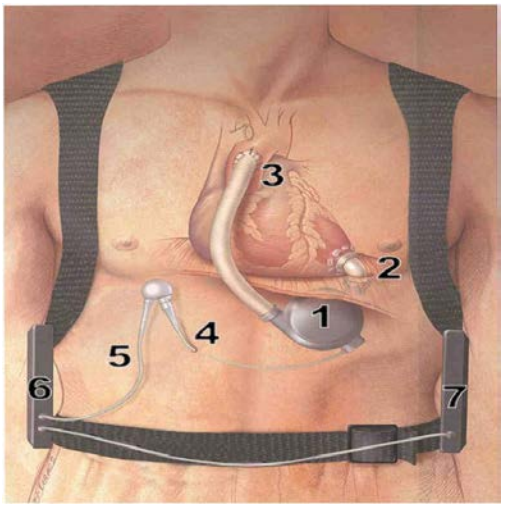
PROTOCOL 5M: Ventricular Assist Device (VAD) Management – Adult, cont.

Heart Mate® II (2nd Generation)



1) *Implanted Pump*
2) *In - flow Cannula*
3) *Out – flow Conduit*
4) *Percutaneous Cable*
5) *Pump Cable Extension*
6) *Controller*
7) *Wearable Battery*

Levacor® VAD (4th Generation)



Hospital Resources in Oklahoma for Patients with a VAD and TAH:

Integris Baptist Medical Center in Oklahoma City is the only VAD/TAH surgical implant site in Oklahoma at the time of this protocol's release.

Upon arrival to the scene, contact a VAD coordinator for assistance with VAD/TAH related questions. An RN coordinator is available 24-hours a day.

24-hour Integris Baptist Medical Center VAD/TAH phone number: 405-713-7040

Cardiac Arrest Care in Patients with a VAD:

Perform chest compressions only after all other treatments have been applied.

Perform standard cardiac arrest resuscitation with the following exceptions/considerations:

Cardioversion or Defibrillation with Heart Mate® II or Levacor® VAD.

DO NOT remove power to VAD prior to cardioversion or defibrillation.

PROTOCOL 5M: Ventricular Assist Device (VAD) Management – Adult, cont.

Non-Cardiac Arrest Care in Patients with a VAD:

Emergencies in a patient with a VAD can arise due to:

- Problems directly related to the VAD:
  - Power Failure. (Heart Mate® II or Levacor® VAD)
  - Suspected mechanical malfunctions characterized by frequent alarms emitting from the system controller, an increase or decrease in flow rates. (Heart Mate® II or Levacor® VAD)
  - Unusual noises (such as grinding or screeching). (Heart Mate® II)
- Focus on switching out the system controller. (see directions below)
- Illness/Injury not related to the VAD - treat per applicable protocol.

Power Failure of a VAD - EMS Assessment & Care:

- A patient experiencing a power failure with their VAD system will present with signs and symptoms of circulatory collapse (dyspnea, hypoxemia, hypotension, dysrhythmias, altered mental status).
- Focus on restoring power to the VAD by switching batteries in the battery pack, connecting to an AC power source, or switching out the system controller.

TROUBLESHOOTING: Heart Mate® II

When the Pump Has Stopped

- Check the connections between the controller and the pump and the power source and fix any loose connections.
- If the pump does not restart and the patient is connected to batteries replace the current batteries with a new, fully-charged pair.
- If pump does not restart, change controllers.

Alarms: Emergency Procedures

Yellow or Red Battery Alarm:
1. Need to change batteries.

Red Heart Flashing Alarm:
1. This may indicate the pump has stopped or there is not enough blood flow going through the pump.
2. Check patient, check connections and power source.
3. Listen with a stethoscope to see if pump is running:
   a. If pump off, change out the controller.
   b. If pump on, assess patient for hypovolemia or arrhythmia and treat according to protocol.

PROTOCOL 5M: Ventricular Assist Device (VAD) Management – Adult, cont.

TROUBLESHOOTING: Heart Mate® II

Changing Batteries

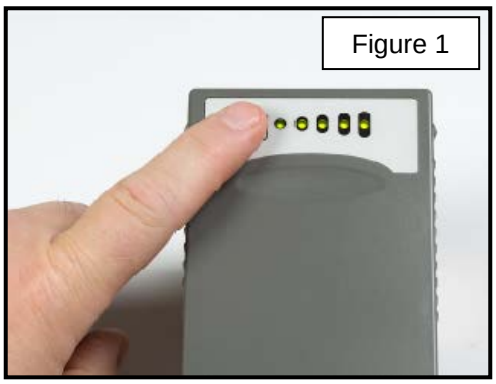


Figure 1

Figure 2

1. Warning: At least one power lead must be connected to a power source at all times.
2. **DO NOT remove** both batteries at the same time or the pump will stop.
3. Obtain two charged batteries from patient's black bag.
4. Check the charge of the battery by pressing the battery gauge button on the end and top of the battery. (Figure 1)
5. Remove **only one battery** from the clip by pressing the tab on the battery clip to release the battery.
6. Controller will start beeping and flashing green lights.
7. Replace with new fully charged battery by lining up the arrows on the battery and the clip and pressing until you hear a "click."
8. Repeat previous steps with the second battery and battery clip. Remove only one battery from the clip by pressing the tab on the battery clip to release the battery.
9. Controller will start beeping and flashing green lights.
10. Replace with new fully charged battery by lining up the arrows on the battery and the clip and pressing until you hear a "click." (Figure 2)
11. Repeat previous steps with the second battery and battery clip.

PROTOCOL 5M: Ventricular Assist Device (VAD) Management – Adult, cont.

TROUBLESHOOTING: Heart Mate® II

Changing Controllers

Heart Mate® II Controller Change – out Procedures:

1. Place the replacement controller within easy reach, along with the batteries/battery clips or PBU cable. **NOTE:The spare controller is usually found in the patient's black bag.**

2. Make sure patient is sitting or lying down since the pump will momentarily stop during this procedure.

3. Rotate the perc lock on the **replacement** controller in the direction of the "unlocked" icon until the perc lock clicks into the fully – unlocked position. (Figure 3)

4. Repeat Step 2 for the **original** controller until the perc lock clicks into the fully – unlocked position

5. Disconnect the perc lead from the **original** controller by pressing the metal release tab on the connector socket. **The pump will stop. An alarm will sound**. (Figs. 4-5)

6. Connect the perc lead to the new **replacement** controller:
   a. Line up the mark on the perc lead connector with the mark on the metal tab on the new controller. (Figure 6)
   b. Fully insert the connector into the socket of the new controller and turn the perc lock to the "locked" position. (Figure 7)

7. Connect the new **replacement** controller to power source (i.e., batteries or PBU cable). The pump should restart.

8. After the pump restarts, rotate the perc lock on the new **replacement** controller in the direction of the "locked" icon until the perc lock clicks into the fully – locked position.

9. Disconnect power from the **original** controller to stop the alarm.

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

PROTOCOL 5M: Ventricular Assist Device (VAD) Management – Adult, cont.

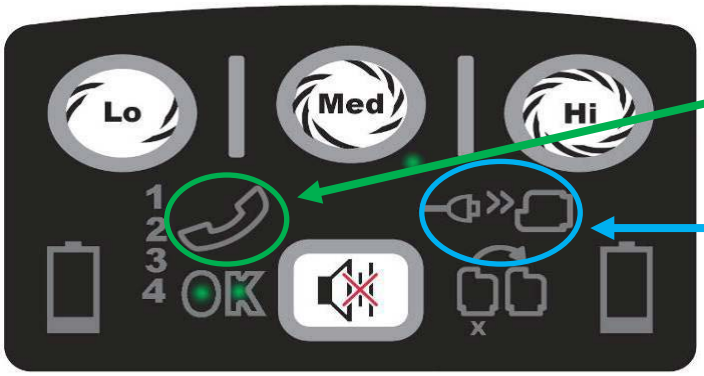
TROUBLESHOOTING: Levacor® VAD

When the Pump Has Stopped

- Check the connections between the controller and the pump and the power source and fix any loose connections.
- If the pump does not restart and the patient is connected to battery replace the current battery with a new, fully-charged battery.
- If pump does not restart, change controllers.

Alarms: Emergency Procedures

1. **Yellow Battery Alarm**: Need to change the battery.
2. **Red Change Controller Alarm**: This may indicate the pump has stopped. Check patient, check connections and power source, listen with a stethoscope to see if pump is running. If pump off, change out the controller. If pump on, call VAD support for assistance.



3. **Telephone Alarm**: One of more of the Levacor® parameters is abnormal. Plug into base unit if possible.
4. **Pump Disconnected Alarm**: Check connections. If connections okay and pump off, change out pump cable extension.

PROTOCOL 5M: Ventricular Assist Device (VAD) Management – Adult, cont.

TROUBLESHOOTING: Levacor® VAD

Changing Batteries

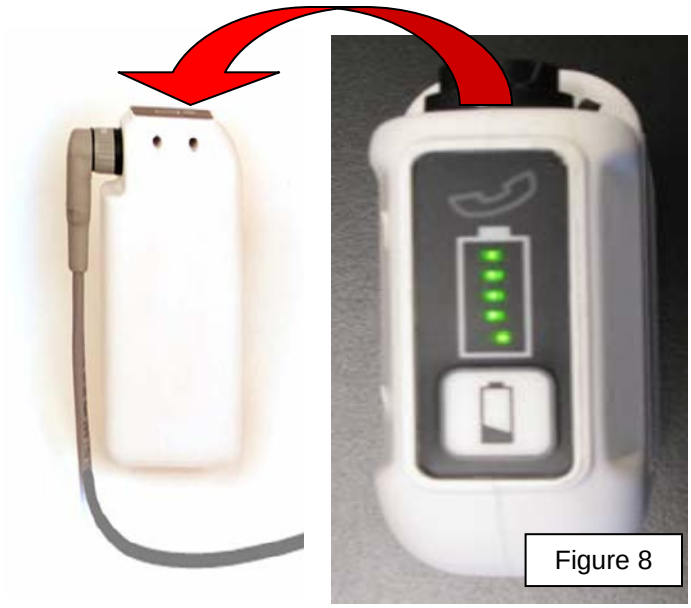


Figure 8

1. The wearable, rechargeable batteries provide power to the external controller and allow the patient to be ambulatory.
2. The battery is typically carried in a carry bag with the controller and weighs about a pound.
3. The battery has 5 green lights to indicate the state of its charge. Each light represent 20% of battery charge. A push button the battery panel will illuminate the lights. (Figure 8)
4. One light will turn to yellow and an alarm will sound when the battery has 20% of less time remaining.
5. One battery should give up to 5 hours worth of power.

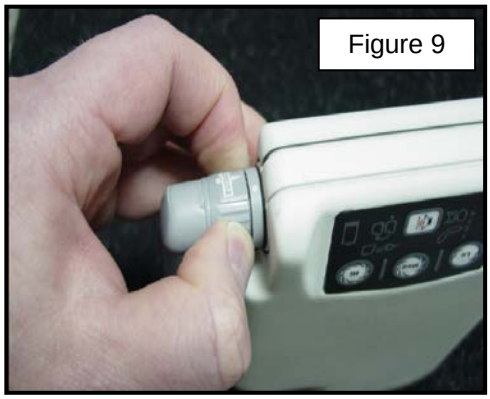


Figure 9

6. To change out the battery, rotate the perc lock on the battery in the direction of the "unlocked" icon until the perc lock clicks into the fully – unlocked position. (Figure 9)
7. Disconnect the current battery from the controller by gently turning the knob to disconnect the battery.
8. The internal battery inside the controller will power the pump while disconnected from the battery.
9. Replace with new fully charged battery by lining up the connector with the controller, gently inserting the knob, and pushing gently until you hear a "click". The battery should lock into place.

PROTOCOL 5M: Ventricular Assist Device (VAD) Management – Adult, cont.

TROUBLESHOOTING: Levacor® VAD

Changing Controllers

1. Locate the backup system controller in the patient's VAD black bag.
2. Make sure patient is sitting or lying down since the pump will momentarily stop during this procedure.
3. Disconnect the pump from the current controller by unscrewing the red to red cable. (Figure 10)
4. Reconnect the pump to the back - up controller by matching up the arrows and screwing the red cable to the red receptacle. (Figure 11)
5. Connect the controller to a power source (battery). (Figure 12)
6. The pump will restart as soon as it is connected to power.

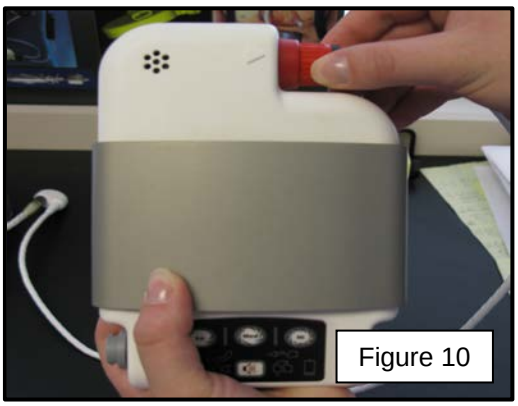


Figure 10

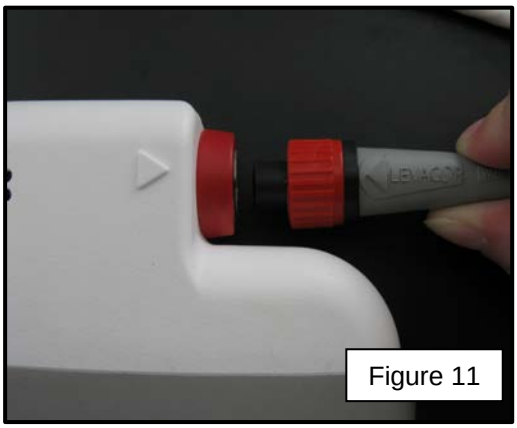


Figure 11

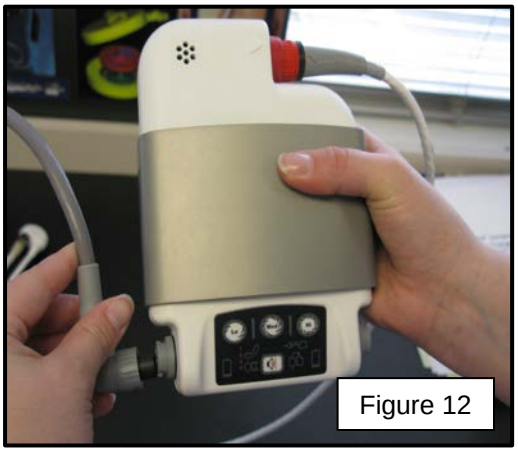
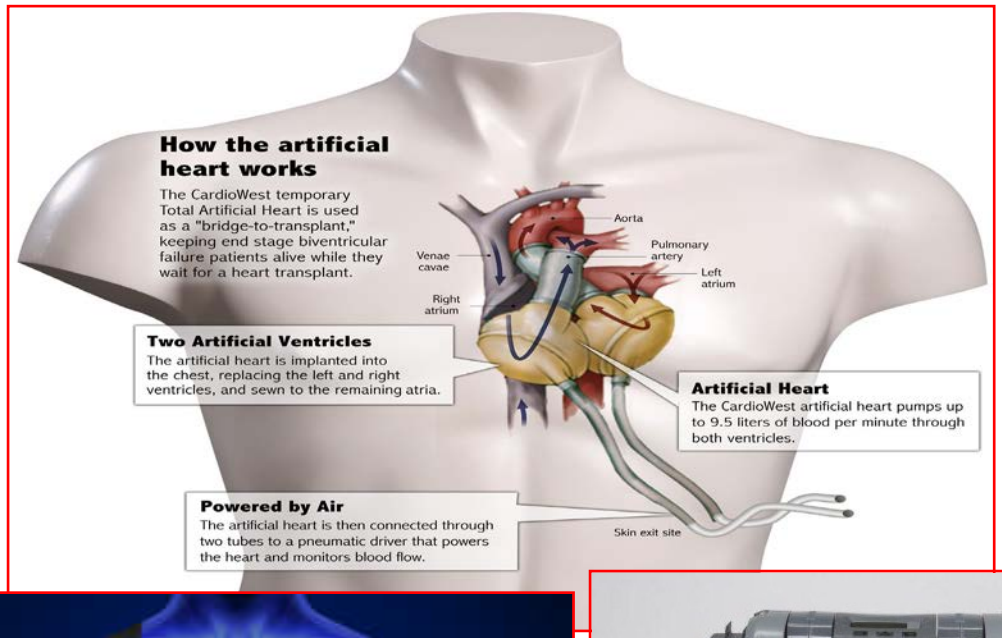


Figure 12

PROTOCOL 5M: Ventricular Assist Device (VAD) Management – Adult, cont.

Total Artificial Heart

Overview:



Basic Operations

1. Pump is connected to 2 drivelines (air lines) that are attached to the driver, which runs the pump
2. Do not kink the drivelines.
3. The electrical conduction system of the heart has been removed so a heart rhythm cannot be viewed on the ECG.
4. Batteries last approximately 2 hours for a set.
5. Plug the driver into an outlet as often as possible for power.

PROTOCOL 5M: Ventricular Assist Device (VAD) Management – Adult, cont.

Total Artificial Heart

When the Pump Has Stopped:
Immediately switch to the back-up driver.

Changing to the Back-Up Driver

1. With the Wire Cutter Tool, cut the Wire Tie under the metal release button of the CPC Connector that secures the **red** TAH Cannula to the **red** Freedom Driveline. DO NOT DISCONNECT THE CANNULA FROM THE DRIVELINE YET.
2. With the Wire Cutter Tool, cut the Wire Tie under the metal release button of the CPC Connector that secures the **blue** TAH Cannula to the **blue** Freedom Driveline. DO NOT DISCONNECT THE CANNULA FROM THE DRIVELINE YET.

CAUTION: Before disconnecting the Drivelines of the primary Freedom Driver, you must have the Drivelines of the backup Freedom Driver within reach. The backup Driver must be turned on by inserting 2 batteries. Perform steps 3 and 4 simultaneously.

3. Disconnect the **red** Cannula from the **red** Driveline of the primary Freedom Driver.
4. Press and hold down the metal release button. (Fig. 11)
5. Pull the **red** Cannula away from the **red** Driveline (Figure 12). **Immediately** insert the **red** Cannula into the new **red** Driveline from the backup Freedom Driver until you hear a click.
6. **Simultaneously** disconnect the **blue** Cannula from the **blue** Driveline of the primary Freedom Driver:
7. Press and hold down the metal release button.
8. Pull the **blue** Cannula away from the **blue** Driveline.
9. **Immediately** insert the **blue** Cannula into the new **blue** Driveline from the back-up Freedom Driver until you hear a click.

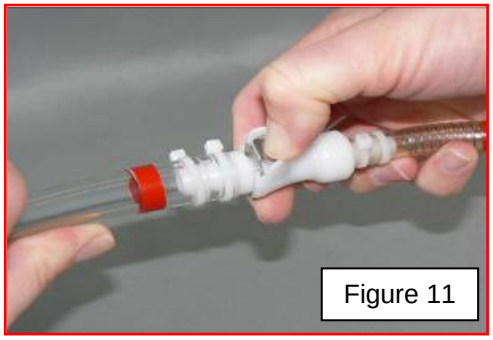


Figure 11

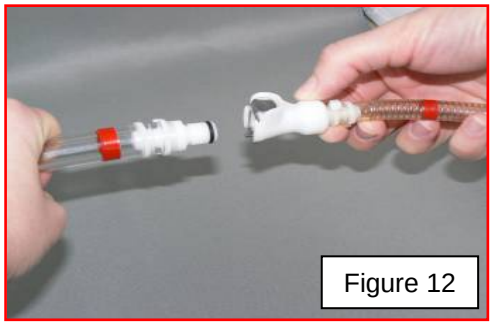


Figure 12

PROTOCOL 5M: Ventricular Assist Device (VAD) Management – Adult, cont.

Total Artificial Heart

Treatment Considerations:

1. External chest compressions cannot be performed on a patient with a Total Artificial Heart. Changing to the back-up driver is essential to maintaining circulation. There's no "hand-pump" to operate the Total Artificial Heart manually.

2. If the pump stops, a red fault alarm along with a continuous audio tone will sound.

3. All device settings are preset and cannot be changed in the field.

4. Since the electrical conduction system of the heart has been removed the underlying ECG rhythm will show asystole. The patient with a Total Artificial Heart should not be defibrillated.

5. If the driver pump is connected and functioning properly, the patient will have a pulse.

6. A measurable blood pressure is obtainable using a manual or automated blood pressure device.

7. Use alternative ways to assess the adequacy of perfusion such as pale vs. pink, dry vs. diaphoretic, and alert vs. confused.

8. Incorporate device into assessment.

9. General Supportive Care and initiate treatment per applicable protocol.

10. Listen just below the heart to hear if the device is running and assess for a palpable pulse.

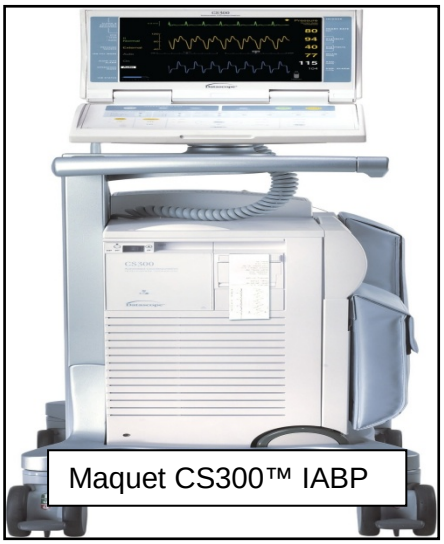
11. If there is no palpable pulse detected, consider the following:
    - The device is not running: Troubleshoot the device and treat per protocol.
    - The device is running, but the patient is still unconscious or unstable:
        - Neurological evaluation: Possible Stroke
        - Expose the patient:
            - Be cautious with trauma shears; don't cut a driveline or cable exiting the patient's body that might be hidden under an article of clothing;
            - Assess the dressings over the driveline exit site (found in the abdominal area) for signs of infection.

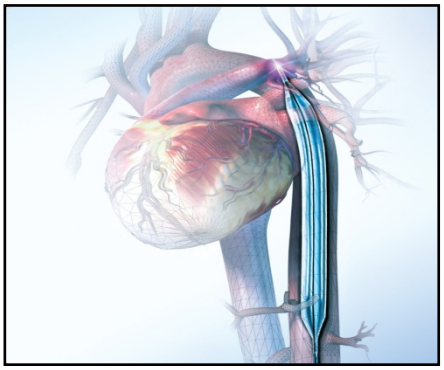
Medical Literature References
5M – Ventricular Assist Device Management – Adult

1. Integris Baptist VAD Program Nurse Coordinators - Review of Protocol in June of 2012.
2. Patel P, Williams JG, Brice JH. Sustained ventricular fibrillation in an alert patient: preserved hemodynamics with a left ventricular assist device. PrehospEmerg Care. 2011 Oct-Dec;15(4):533-6.
3. Keseg DP. Pumping life into failing hearts. What EMS providers should know about ventricular assist devices. EMS World. 2011 Mar;40(3):55-9.
4. Busch MC, Haap M, Kristen A, Haas CS. Asymptomatic sustained ventricular fibrillation in a patient with left ventricular assist device. Ann Emerg Med. 2011 Jan;57(1):25-8.
5. Walters WA, Wydro GC, Hollander T, Brister N. Transport of the ventricular assist device-supported patient: a case series. PrehospEmerg Care. 2005 Jan-Mar;9(1):90-7.
6. Bramstedt KA, Simeon DJ. The challenges of responding to "high-tech" cardiac implant patients in crisis. PrehospEmerg Care. 2002 Oct-Dec;6(4):425-32.

5N – INTRA-AORTIC BALLOON PUMP (IABP) MONITORING - ADULT

EMT-PARAMEDIC


Maquet CS300™ IABP



Introduction:

Transfer of patients between hospitals is and will be an increasing demand due to an aging society and the increasing invasiveness of recommended therapies. Intra-aortic balloon pumps are used in mechanical circulatory support. The reduction in size and weight of the respective devices now allows an increasing number of interfacility transfers with continuing mechanical circulation support.

Indications for Intra-Aortic Balloon Pump (IABP):

IABP counter-pulsation support is a recommended option for patients with cardiac failure, mainly due to coronary artery disease or congestive heart failure. Early IABP support is used to accompany acute percutaneous coronary intervention (PCI) or cardiac surgery. In addition, IABP support may function as a bridge prior to invasive procedures if these specialties are unavailable at the initial hospital of admission. If in such a situation inter-hospital transfer is mandatory, IABP support must be maintained in clinical settings that may include refractory unstable angina, impending or acute myocardial infarction, ventricular failure, acute valvular disease, and cardiogenic shock.

Objective of the Transport Team:

1. Provide skilled personnel and the equipment to deliver specialized care needed to stabilize, maintain, and transport critically ill patients with IABP support.

   NOTE: Paramedic may provide, or assist in providing mechanical circulatory support during interfacility transport only if they have completed special additional training in the use of IABP including appropriate continuing education and are properly credentialed by the appropriate local medical oversight physician(s) to operate or assist with IABP.

Protocol 5N: Intra – Aortic Balloon Pump Monitoring (IABP) – Adult, cont.

Before transport of the patient:

1. Together with physician, nurse, or cardiovascular technical staff (as appropriate), ensure that intra-aortic balloon catheter is properly secured, check intra-aortic balloon insertion site for bleeding or drainage, confirm adequacy of distal pulses and perfusion, and record pre-transport intra-aortic balloon pump settings.
   - **NOTE**: IT MAY BE NECESSARY TO USE A DOPPLER STETHOSCOPE TO CONFIRM PULSATILE FLOW IF CARDIOGENIC SHOCK IS SEVERE.
2. Measure and record augmented systolic, mean, and diastolic blood pressure in addition to standard vital signs.
3. If the transport is not accompanied by a physician or nurse, obtain written order for intra-aortic balloon pump settings to be used enroute.
   - **NOTE**: IF YOU ARE NOT FAMILIAR WITH THE TYPE OF INTRA-AORTIC BALLOON PUMP BEING USED, OR DO NOT FEEL COMFORTABLE WITH THE INTRA-AORTIC BALLOON PUMP SETTINGS PRESCRIBED BY THE SENDING PHYSICIAN, DO NOT ATTEMPT TRANSPORT. CONTACT ON-LINE MEDICAL CONTROL FOR FURTHER INSTRUCTIONS.
4. Ensure that the intra-aortic balloon pump being used is properly functioning, that an acceptable ECG trigger is present, and that all settings are correct.

During transport of the patient:

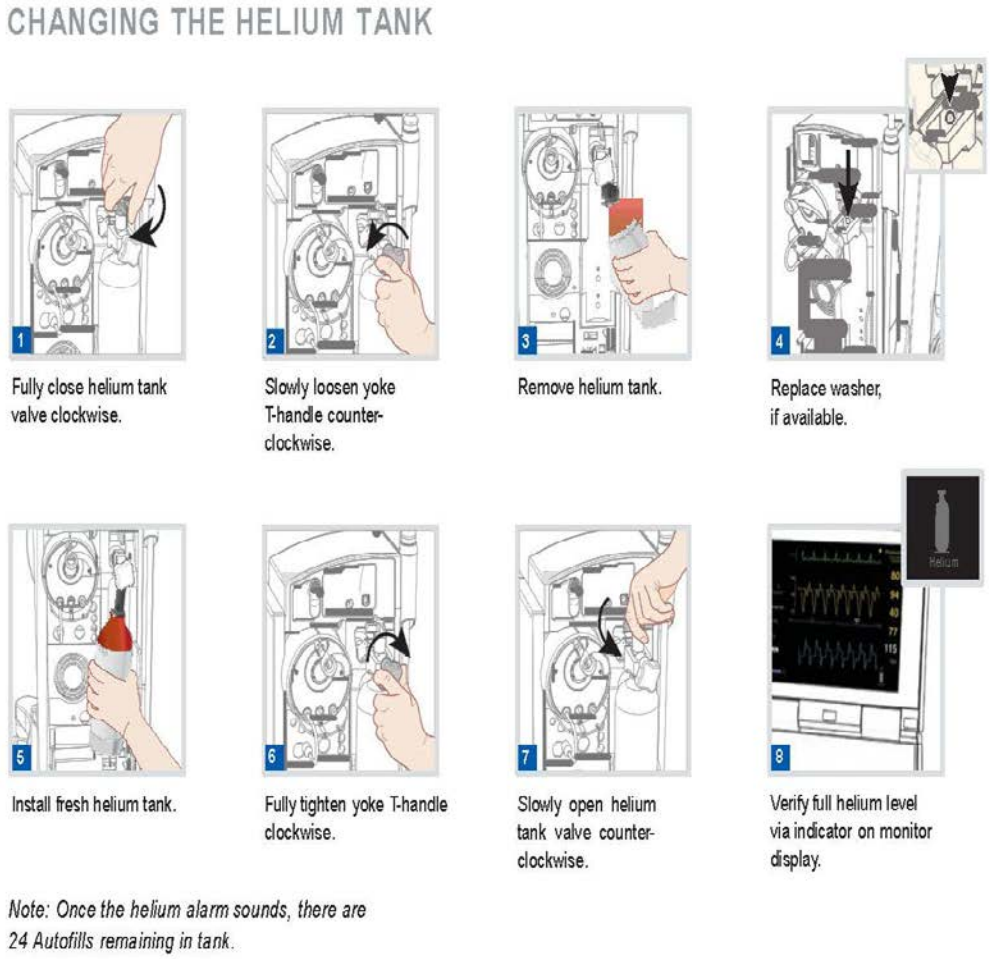
1. Continuously monitor augmented systolic, mean, and diastolic blood pressure in addition to standard vital signs.
2. In the event of mechanical failure, and the patient remains stable, attempt to identify and correct the problem.
3. In the event of a clinical emergency, and a physician, nurse practitioner, or physician surrogate IS present, assist with intra-aortic balloon pump management on request, and contact on-line medical control (or duly authorized agent) as soon as possible (without compromising patient safety).
4. In the event of a clinical emergency, and a physician, nurse practitioner, or physician surrogate is **NOT** present, proceed with cardiopulmonary resuscitation as indicated, and contact on-line medical control as soon as possible (without compromising patient safety).
   - **NOTE**: CARDIOPULMONARY RESUSCITATION AND DEFIBRILLATION MAY BE PERFORMED WHILE THE INTRA-AORTIC BALLOON PUMP IS FUNCTIONING.

After transport of the patient:

Record type and model of intra-aortic balloon pump used, settings employed in-transport, and augmented systolic, mean and diastolic blood pressures obtained post-transport, as well as any changes in patient condition, modifications in intra-aortic balloon pump settings, and unusual incidents occurring enroute.

Protocol 5N: Intra – Aortic Balloon Pump Monitoring (IABP) – Adult, cont.

Troubleshooting the Maquet CS300™ IABP – (see protocol Special Note):



Protocol 5N: Intra – Aortic Balloon Pump Monitoring (IABP) – Adult, cont.

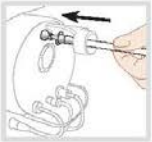
Troubleshooting the Maquet CS 300™ IABP, cont:

ALARMS

Augmentation Below Limit Set

Probable Cause	Corrective Action
Hemodynamic status has changed: ↑HR, ↓SV, ↓MAP.	Treat patient, adjust alarm limit as appropriate.
Alarm limit set too high.	Press AUG. ALARM key, change limit.

Autofill Failure



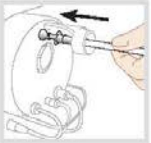
Probable Cause	Corrective Action
IAB disconnected.	Attach IAB catheter.
Helium tank is closed.	Open helium tank.
Helium tank is empty.	Change helium tank.
Incorrect IAB catheter extender tubing length.	Ensure only one IAB catheter extender tubing is connected from IAB to pump.

ALARMS

Check IAB Catheter

Probable Cause	Corrective Action
Kink in IAB catheter or tubing.	Relieve kink if possible, press START.
Membrane has not completely unfolded.	Manually inflate and deflate IAB.
IAB remains in sheath.	Check the markings of the IAB and withdraw sheath if indicated.

IAB Disconnected



Probable Cause	Corrective Action
IAB catheter or extender tubing is disconnected.	Reattach IAB, press START.

Protocol 5N: Intra – Aortic Balloon Pump Monitoring (IABP) – Adult, cont.

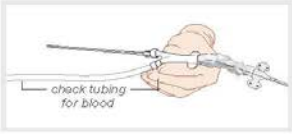
Troubleshooting the Maquet CS300™ IABP, cont:

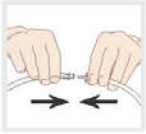
ALARMS

Prolonged Time in Standby

Probable Cause	Corrective Action
IABP has been in STANDBY mode for an extended period of time.	Verify whether it is appropriate to resume pumping.

Rapid Gas Loss or Leak in IAB Circuit





Probable Cause	Corrective Action
Gas loss has been detected in IAB circuit.	If blood observed - STOP pumping. Prepare for removal of IAB. If blood is not observed, verify connections are leak-free. With Rapid Gas Loss, resume pumping by pressing START key. With Leak in IAB Circuit, press IAB FILL key for 2 seconds to initiate an AUTOFILL, then resume pumping by pressing START key.

ALARMS

Unable to Calibrate IAB Optical Sensor

Probable Cause	Corrective Action
Patient's pulse pressure is inadequate for calibration.	When patient's pulse pressure improves, press ZERO PRESSURE key for 2 seconds while the IABP is assisting. Provide alternate A.P. source (i.e.: radial).
Extender tubing or balloon catheter may be restricted.	Relieve restriction. Attempt calibration by pressing ZERO PRESSURE key for 2 seconds while IABP is assisting.
IAB FILL mode is set to MANUAL.	If appropriate, set IAB FILL mode to AUTO via PUMP OPTIONS menu.

IAB Optical Sensor Calibration Expired

Probable Cause	Corrective Action
A calibration update has been intentionally post-poned because either patient's mean arterial pressure may be too low to pause assist or less than 15 minutes have elapsed since last calibration.	Assess patient to determine if a brief pause in assist would be toler-ated, and if so, press ZERO PRESSURE key for 2 seconds while IABP is assisting. Provide alternate A.P. source (i.e.: radial).
Pump is either in STANDBY or the IAB FILL mode is set to MANUAL.	Verify that IAB FILL mode is set to AUTO. Resume pumping, then press ZERO PRESSURE key for 2 seconds to initiate a calibration.

Protocol 5N: Intra – Aortic Balloon Pump Monitoring (IABP) – Adult, cont.

Troubleshooting the Maquet CS300™ IABP, cont:

ALARMS

A.P. Optical Sensing Module Failure

Probable Cause	Corrective Action
There has been a failure of the A.P. Optical Sensing Module in the pump console.	Replace CS300, if available. If replacement pump not available, an alternate A.P source (i.e.: radial) must be provided. Contact MAQUET Service for optical module repair.

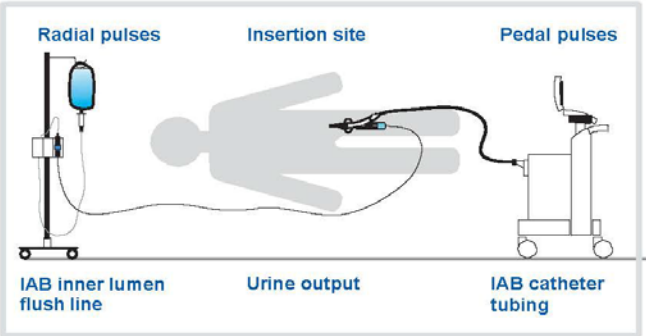
IAB Optical Sensor Failure

Probable Cause	Corrective Action
There has been a failure of the Optical Sensor in the IAB.	Unplug Sensor Connector and reconnect. If problem persists, provide alternate A.P. source (i.e.: radial).

Unable to Update Timing

Probable Cause	Corrective Action
Poor waveform quality.	Check cable connections. Verify transducer was not left vented, if in use. If transducer is in use, aspirate and flush fluid circuit. If problem persists, switch operation mode to SEMI AUTO, verify TRIGGER SOURCE, adjust timing, resume pumping.
Sustained heart rate is less than 30 BPM or greater than 150 BPM.	Switch to SEMI AUTO, verify TRIGGER SOURCE, adjust timing.
Poor diastolic augmentation.	If diastolic augmentation is poor, when AUGMENTATION level is set to MAX, attempt to improve patient's hemodynamic status.

PATIENT ASSESSMENT



Assessment	Corrective Action
Radial pulses Left radial pulse weak or left arm ischemia.	Check position of IAB.
Insertion site Excessive bleeding from insertion site.	Apply pressure, ensure distal flow.
Pedal pulses Limb ischemia detected.	Consider removing IAB, consider insertion via opposite limb.
IAB inner lumen flush line Pressure waveform damped (If using a conventional IAB).	Aspirate inner lumen. If line patent, flush for 15 seconds (with IABP on Standby).
Urine output Urine output low.	Check position of IAB.
IAB catheter tubing Blood observed in catheter tubing.	STOP pumping and prepare for IAB removal.

Protocol 5N: Intra – Aortic Balloon Pump Monitoring (IABP) – Adult, cont.

Special Note:

This protocol utilizes Maquet CS300™ IABP to illustrate one form of IABP mechanical circulatory support for utilization in EMS interfacility transfer. The Oklahoma State Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the Maquet CS300™ IABP for IABP mechanical circulatory support for utilization in EMS interfacility transfer. Check with your EMS system's medical oversight physician(s) for specific protocol directions and clinical privilege allowances regarding IABP mechanical circulatory support during EMS interfacility transfer.

Medical Literature References
5N – Intra-Aortic Balloon Pump (IABP) Monitoring – Adult

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SECTION 6

NEUROLOGIC/ALTERED MENTAL STATUS

6A - STROKE ADULT & PEDIATRIC

TREATMENT PRIORITIES

3 in 5 minutes of patient contact:
1. Vital signs
2. O_2 if indicated
3. Los Angeles Prehospital Stroke Screen

Early transport & ED notification if symptoms <3 hours

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
CONDUCT STROKE SCREENING QUERY IF AUTHORIZED BY
LOCAL MEDICAL DISPATCH PROTOCOL.

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM IF DYSPNEA OR PULSE OX <94% AT ROOM AIR

LOS ANGELES PREHOSPITAL STROKE SCREEN
AGE OVER 45 YEARS?
NO PRIOR HX OF SEIZURE DISORDER?
NEW ONSET OF NEUROLOGIC SYMPTOMS IN LAST 24 HRS?
PATIENT AMBULATORY AT BASELINE [PRIOR TO EVENT]?
BLOOD GLUCOSE 50 TO 400 mg/dL?
FACIAL DROOP; ARM DRIFT; IMPAIRED SPEECH?

EARLY "STROKE ALERT" NOTIFICATION TO RECEIVING EMERGENCY DEPARTMENT
WITH DEFINITIVE STROKE SYMPTOMS IF LESS THAN 3 HOURS DURATION

APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (if equipped)
TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT

EMT OR HIGHER LICENSE:
MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, **Mandatory use if pt intubated)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS ARE INEFFECTIVE

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

IV ACCESS
IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ADULT: MEDICATION-ASSISTED INTUBATION IF INDICATED

EVALUATE FOR OTHER ALTERED MENTAL STATUS ETIOLOGIES. TREAT PER APPROPRIATE PROTOCOL(S)
CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
6A – Stroke – Adult & Pediatric

1. Protocol expert consultant: Lawrence Davis, MD. Oklahoma City. Board certified in neurology and vascular neurology by the American Board of Psychiatry and Neurology.
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6B - ALTERED MENTAL STATUS ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES

1. Vital signs
2. O_2
3. Dextrose for hypoglycemia
4. Benzodiazepine for sustained, active seizure (refer to 6D Seizure if applicable)

Evaluate differential diagnosis of AMS & treat per protocol(s):

- Hypoxemia (Shock)
- Head Injury
- Stroke
- Seizure
- Infection (Sepsis/ Meningitis)
- Medication/Alcohol
- Heat or Cold Illness

EMD

KEEP PATIENT FREE FROM INJURY HAZARDS
AVOID PLACING ANYTHING IN MOUTH
PLACE IN RECOVERY POSITION POST SEIZURE

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE

DETERMINE BLOOD GLUCOSE
FOR PATIENT ABLE TO SWALLOW
ADULT & PEDIATRIC WEIGHT ≥25 kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dl, 1tube ORAL GLUCOSE (15g) PO
PEDIATRIC WEIGHT <25kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dl, ½ tube ORAL GLUCOSE (7.5g) PO

APPLY CARDIAC MONITOR (if equipped)

EMT OR HIGHER LICENSE:
MEASURE END–TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHy
(if equipped, **Mandatory use if pt intubated)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED &
ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT-I85 / AEMT

ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

ADULT & PEDIATRIC WEIGHT ≥25 kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL, D50 1 mL/kg IVP UP TO 50 mL
GLUCAGON 1 mg IM IF NO VASCULAR ACCESS OBTAINED
PEDIATRIC WEIGHT <25kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL D25 2 mL/kg IVP UP TO 50 mL
GLUCAGON 0.5 mg IM IF NO VASCULAR ACCESS OBTAINED
ADULT & PEDIATRIC: REPEAT DETERMINATION OF BLOOD GLUCOSE POST-DEXTROSE TREATMENT

ADULT: INTUBATE IF INDICATED; DO NOT INTUBATE PATIENTS WITH RAPIDLY REVERSIBLE ETIOLOGY (eg. HYPOGLYCEMIA, OPIATES)

ADVANCED EMT OR HIGHER LICENSE:
TOXINS/DRUG OVERDOSE – SUSPECTED NARCOTIC/OPIATE – APNEIC/AGONALLY BREATHING
ADULT: NALOXONE 2 mg IVP/IOP/IN MAY REPEAT ONCE
PEDIATRIC: NALOXONE 0.5 mg IVP/IOP/IN, MAY REPEAT TO MAX OF 2 mg

TOXINS/DRUG OVERDOSE – SUSPECTED NARCOTIC/OPIATE – INEFFECTIVE BREATHING ACTIVITY
ADULT & PEDIATRIC: NALOXONE 0.5 mg IVP/IOP/IN, MAY REPEAT TO MAX OF 2 mg
USE NALOXONE TO RESTORE EFFECTIVE BREATHING; AVOID EXCESSIVE DOSING TO PREVENT WITHDRAWAL

PARAMEDIC

ADULT: MEDICATION-ASSISTED INTUBATION IF INDICATED
CONTINUOUS ASSESSMENT & TREATMENT OF SUSPECTED AMS ETIOLOGY PER APPLICABLE PROTOCOL(S)
CONSULT OLMC IF ABOVE TREATMENT INEFFECTIVE FOR HYPOGLYCEMIA OR NARCOTIC/OPIATE ETIOLOGY
CONSULT OLMC IF UNCERTAIN OF ETIOLOGY AND TREATMENT PLAN OF AMS
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
6B – Altered Mental Status – Adult & Pediatric

1. Weber JM, Tataris KL, Hoffman JD, Aks SE, Mycyk MB. Can nebulized naloxone be used safely and effectively by emergency medical services for suspected opioid overdose? PrehospEmerg Care. 2012 Apr-Jun;16(2):289-92.
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6C – GLUCOMETRY (BLOOD GLUCOSE DETERMINATION) ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:

1. Suspected stroke (as part of Los Angeles Prehospital Stroke Screen)
2. Altered mental status – unclear etiology
3. Seizure
4. Known or suspected diabetes

Contraindications: None

Technique (ACCU-CHEK® Aviva System - see protocol Special Note):

1. Coding the meter. (Figures 1, 2, 3)
    a. Change the code key **EVERY TIME** a new box of test strips is opened. For accurate results, it is important to be sure the code key matches the code number on the test strip container.
2. Turn over the code key so the code number faces away from you. Push it into the code key slot until it stops. (Figure 4)
3. Leave the code key in the meter until you open a new box of test strips. (Figure 5) Don't force the code key into the meter; it is made to go into the meter only one way. If you see "code" and "- - -" on the display, turn off the meter and reinsert a code key into the meter.

PROTOCOL 6C: Glucometry – Blood Glucose Determination, cont.

4. Adjusting the Time and Date – First Time Use.
    a. New meters come with a preset time and date.
    b. Time may need to change to specific time zone.
    c. Have the correct time and date is important for event documentation. NOTE: When installing a new battery, the meter automatically prompts to check the time and date.
    d. Press and release to turn on the meter. The time and date appear on the display. If this is the correct time and date, press and hold to exit the set-up mode. (Figure 6)
    e. Press and release or to decrease or increase the hour. Press and hold or to scroll faster. (Figure 7)
    f. Press and release to set the hour, minutes, am/pm, mouth, day and year. (Figure 8)
5. Using the ACCU-CHEK® Aviva System Test Strips:
    a. Use only ACCU–CHEK® Aviva System test strips. Using other test strips with this meter can produce inaccurate results.
    b. Replace code key and run a control test every time a new box of test strips is used.
    c. Store unused test strips in original container.
    d. Do not use **EXPIRED** test strips.
    e. Do not apply blood to the test strip before inserting the test strip into the meter. If the meter displays a result before applying blood **DO NOT** use that result.
    f. Do not reuse test strips. Once blood is applied to test strip discard it.
    g. If another glucometry reading is required, use a new test strip.
    h. Do not expose strips to heat outside the recommended range, moisture or humidity.

<u>Determining Blood Glucose</u>:

1. Assemble equipment, including performing steps as detailed above when indicated.
2. Using universal precautions, take one test strip from the container.
3. Insert a test strip into the meter in the direction of the arrows. The meter turns on. (Figure 9)
4. Make sure the code on the display matches the code number on the test strip container. (Figure 10) If the code number is not seen, take the test strip out and reinsert into meter.
5. When the blood drop symbol flashes, obtain a drop of blood from the fingertip. (Figure 11)
6. Position hand palm-side up; choose whichever finger is least calloused. (Figure 12)
7. Apply intermittent pressure to the finger to help the blood to flow. (Figure 13)
8. Clean the fingertip with alcohol. Start in the middle and work outward to prevent contaminating the area. Allow area to dry. (Figure 14)
9. Hold the finger and firmly place a new, sterile lancet **<u>off-center</u>** on the finger tip and firmly press the lancet to puncture the fingertip. (Figure 15)
10. Wipe away the first drop of blood with a sterile gauze pad. (Figure 16)
11. Touch the drop of blood to the yellow window of the test strip. DO NOT put blood on top of the test strip. (Figure 17)
12. When a flash is observed enough blood is on the test strip; if blood is applied and a flash is not seen, more blood should be applied within 5 seconds. (Figure 18)
13. Properly dispose of all contaminated supplies.

PROTOCOL 6C: Glucometry – Blood Glucose Determination, cont.

Figure 1

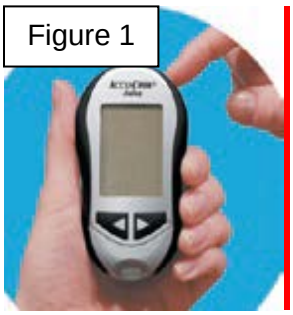
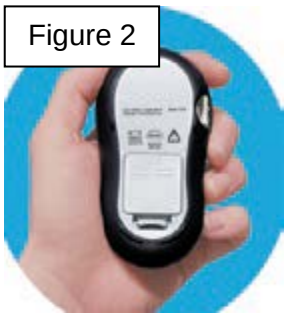


Figure 2



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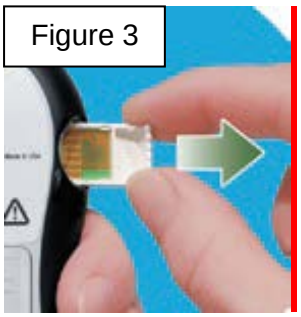

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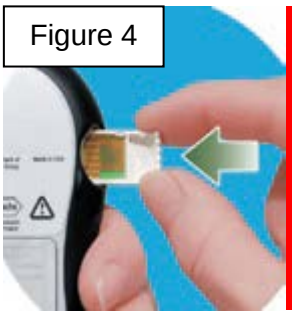
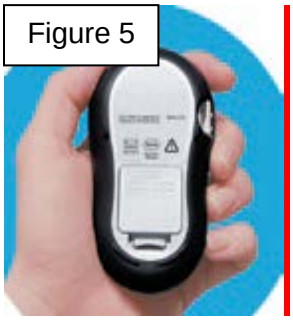


Figure 5



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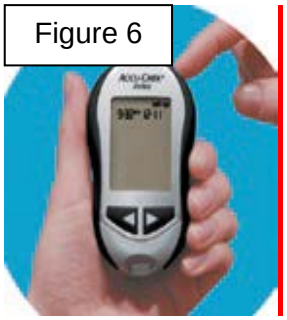


Figure 7

Figure 8

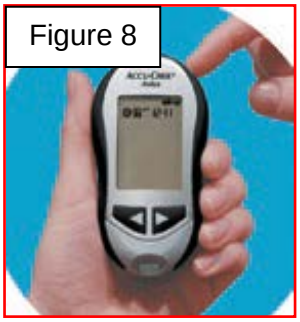


Figure 9

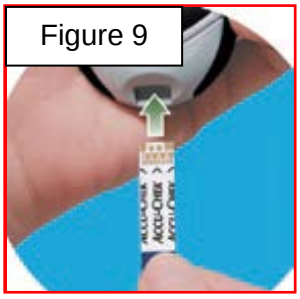


Figure 10

Figure 11

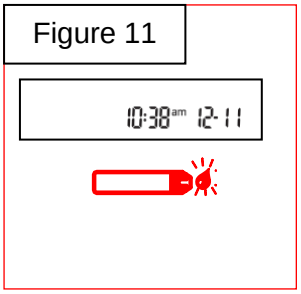


Figure 12

Figure 13

Figure 14

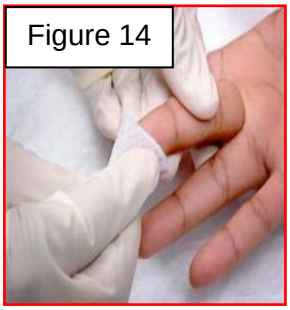


Figure 15

Figure 16

Figure 17

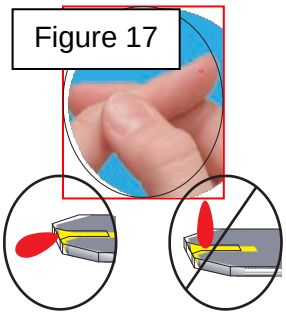
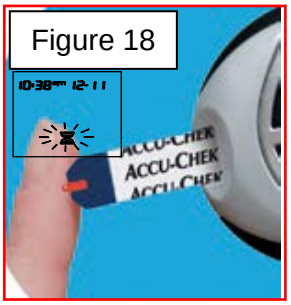


Figure 18



Special Note:

This protocol utilizes the ACCU-CHEK® Aviva System to illustrate one method of performing glucometry. The Oklahoma State Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the ACCU-CHEK® Aviva System for glucometry by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in glucometry if not using the ACCU-CHEK® Aviva System.

Medical Literature References
6C – Glucometry (Blood Glucose Determination) – Adult & Pediatric

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STATE OF OKLAHOMA
2013 EMERGENCY MEDICAL SERVICES PROTOCOLS

Oklahoma State Department of Health

Emergency Medicine University of Oklahoma

EMS DIVISION

6D - SEIZURE ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES

1. Vital signs
2. O_2
3. Dextrose for hypoglycemia
4. Benzodiazepine for sustained, active seizure

EMD

KEEP PATIENT FREE FROM INJURY HAZARDS
AVOID PLACING ANYTHING IN MOUTH
PLACE IN RECOVERY POSITION POST SEIZURE

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC or NRB AS APPROPRIATE
APPLY CARDIAC MONITOR (if equipped)

EMT OR HIGHER LICENSE:

MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, **Mandatory use if pt intubated)

EMT-I85 / AEMT

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

DETERMINE BLOOD GLUCOSE
ADULT & PEDIATRIC WEIGHT ≥25 kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL, D50 1 mL/kg IVP UP TO 50 mL
GLUCAGON 1 mg IM IF NO VASCULAR ACCESS OBTAINED
PEDIATRIC WEIGHT <25kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL, D25 2 mL/kg IVP UP TO 50 mL
GLUCAGON 0.5 mg IM IF NO VASCULAR ACCESS OBTAINED

PARAMEDIC

EVALUATE FOR OTHER ALTERED MENTAL STATUS ETIOLOGIES. TREAT PER APPROPRIATE PROTOCOL(S)

ADULT: MIDAZOLAM 0.1 mg/kg IM/IVP/IN/IOP TO MAX OF 5 mg FOR ACTIVE SEIZURE. MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING.
ADULT: DIAZEPAM 5 mg IVP/IOP or 10 mg IM FOR ACTIVE SEIZURE IF MIDAZOLAM NOT AVAILABLE.
MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING. **OR**
ADULT: LORAZEPAM 2 mg IVP/IOP/IM FOR ACTIVE SEIZURE IF MIDAZOLAM NOT AVAILABLE.
MAY REPEAT X 1 IN 10 MINS IF STILL SEIZING.

PEDIATRIC: MIDAZOLAM 0.1 mg/kg IM/IVP/IN/IOP TO MAX OF 5 mg FOR ACTIVE SEIZURE. MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING.
PEDIATRIC: DIAZEPAM 0.1 mg/kg TO MAX OF 5 mg IVP/IOP/IM FOR ACTIVE SEIZURE IF MIDAZOLAM NOT AVAILABLE.
MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING. **OR**
PEDIATRIC: LORAZEPAM 0.1 mg/kg TO MAX OF 2 mg IVP/IOP/IM FOR ACTIVE SEIZURE IF MIDAZOLAM NOT AVAILABLE
MAY REPEAT X 1 IN 10 MINS IF STILL SEIZING.

OLMC CONSULT IF SEIZURE CONTINUES DESPITE ABOVE TREATMENT

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
6D – Seizure – Adult & Pediatric

1. Brophy GM, Bell R, Claassen J, Alldredge B, Bleck TP, Glauser T, Laroche SM, Riviello JJ Jr, Shutter L, Sperling MR, Treiman DM, Vespa PM; Neurocritical Care Society Status Epilepticus Guideline Writing Committee. Guidelines for the Evaluation and Management of Status Epilepticus. Neurocrit Care. 2012 Apr 24. [Epub ahead of print]
2. Silbergleit R, Durkalski V, Lowenstein D, Conwit R, Pancioli A, Palesch Y, Barsan W; NETT Investigators. Intramuscular versus intravenous therapy for prehospital status epilepticus. N Engl J Med. 2012 Feb 16;366(7):591-600.
3. Shearer P, Riviello J. Generalized convulsive status epilepticus in adults and children: treatment guidelines and protocols. Emerg Med Clin North Am. 2011 Feb;29(1):51-64.
4. Vilke GM, Castillo EM, Ray LU, Murrin PA, Chan TC. Evaluation of pediatric glucose monitoring and hypoglycemic therapy in the field. PediatrEmerg Care. 2005 Jan;21(1):1-5.
5. Vilke GM, Sharieff GQ, Marino A, Gerhart AE, Chan TC. Midazolam for the treatment of out-of-hospital pediatric seizures. PrehospEmerg Care. 2002 Apr-Jun;6(2):215-7.
6. Alldredge BK, Gelb AM, Isaacs SM, Corry MD, Allen F, Ulrich S, Gottwald MD, O'Neil N, Neuhaus JM, Segal MR, Lowenstein DH. A comparison of lorazepam, diazepam, and placebo for the treatment of out-of-hospital status epilepticus. N Engl J Med. 2001 Aug 30;345(9):631-7.
7. Alldredge BK, Wall DB, Ferriero DM. Effect of prehospital treatment on the outcome of status epilepticus in children. Pediatr Neurol. 1995 Apr;12(3):213-6.

Oklahoma State Department of Health

STATE OF OKLAHOMA
2013 EMERGENCY MEDICAL SERVICES PROTOCOLS

Emergency Medicine University of Oklahoma
EMS DIVISION

6E - SYNCOPE ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES

1. Vital signs
2. O_2
3. Dextrose for hypoglycemia
4. Benzodiazepine for sustained, active seizure (refer to 6D Seizure if applicable)

Evaluate differential diagnosis of Syncope & treat per protocol(s):

- Acute Coronary Syndrome
- Cardiac Dysrhythmia
- Hypotension (Shock)
- Hypoxemia (Shock)
- Head Injury
- Stroke
- Seizure
- Infection (Sepsis/ Meningitis)
- Medication/Alcohol
- Heat or Cold Illness
- Psychogenic/Emotion

EMD

KEEP PATIENT FREE FROM INJURY HAZARDS
AVOID PLACING ANYTHING IN MOUTH
ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES)
PLACE IN RECOVERY POSITION/POSITION OF COMFORT

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE

DETERMINE BLOOD GLUCOSE
FOR PATIENT ABLE TO SWALLOW
ADULT & PEDIATRIC WEIGHT ≥25 kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL, 1tube ORAL GLUCOSE (15g) PO
PEDIATRIC WEIGHT <25kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL, ½ tube ORAL GLUCOSE (7.5g) PO

APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (if equipped)
TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT

EMT OR HIGHER LICENSE:
MEASURE END–TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY
(if equipped, **Mandatory use if pt intubated)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED &
ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT-I85 / AEMT

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

ADULT & PEDIATRIC WEIGHT ≥25 kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dl, D50 1 mL/kg IVP UP TO 50 mL
GLUCAGON 1 mg IM IF NO VASCULAR ACCESS OBTAINED
PEDIATRIC WEIGHT <25kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dl, D25 2 mL/kg IVP UP TO 50 mL
GLUCAGON 0.5 mg IM IF NO VASCULAR ACCESS OBTAINED
ADULT & PEDIATRIC: REPEAT DETERMINATION OF BLOOD GLUCOSE POST-DEXTROSE TREATMENT

ADULT: INTUBATE IF INDICATED; DO NOT INTUBATE PATIENTS WITH RAPIDLY REVERSIBLE AMS ETIOLOGY (eg. HYPOGLYCEMIA, OPIATES)

ADVANCED EMT OR HIGHER LICENSE:
TOXINS/DRUG OVERDOSE – SUSPECTED NARCOTIC/OPIATE – APNEIC/AGONALLY BREATHING
ADULT: NALOXONE 2 mg IVP/IOP/IN MAY REPEAT ONCE
PEDIATRIC: NALOXONE 0.5 mg IVP/IOP/IN, MAY REPEAT TO MAX OF 2 mg

TOXINS/DRUG OVERDOSE – SUSPECTED NARCOTIC/OPIATE – INEFFECTIVE BREATHING ACTIVITY
ADULT & PEDIATRIC: NALOXONE 0.5 mg IVP/IOP/IN, MAY REPEAT TO MAX OF 2 mg
USE NALOXONE TO RESTORE EFFECTIVE BREATHING; AVOID EXCESSIVE DOSING TO PREVENT WITHDRAWAL

PARAMEDIC

ADULT: MEDICATION-ASSISTED INTUBATION IF INDICATED
CONTINUOUS ASSESSMENT & TREATMENT OF SUSPECTED AMS ETIOLOGY PER APPLICABLE PROTOCOL(S)
CONSULT OLMC IF ABOVE TREATMENT INEFFECTIVE FOR HYPOGLYCEMIA OR NARCOTIC/OPIATE ETIOLOGY
CONSULT OLMC IF UNCERTAIN OF ETIOLOGY AND TREATMENT PLAN OF AMS
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
6E – Syncope – Adult & Pediatric

1. Weber JM, Tataris KL, Hoffman JD, Aks SE, Mycyk MB. Can nebulized naloxone be used safely and effectively by emergency medical services for suspected opioid overdose? Prehosp Emerg Care. 2012 Apr-Jun;16(2):289-92.
2. Silbergleit R, Durkalski V, Lowenstein D, Conwit R, Pancioli A, Palesch Y, Barsan W; NETT Investigators. Intramuscular versus intravenous therapy for prehospital status epilepticus. N Engl J Med. 2012 Feb 16;366(7):591-600.
3. Somani R, Baranchuk A, Guzman JC, Morillo CA. The role of Emergency Medical Services in the assessment and management of syncope. Int J Cardiol. 2012 Feb 9;154(3):368-9.
4. Grossman SA, Babineau M, Burke L, Kancharla A, Mottley L, Nencioni A, Shapiro NI. Do outcomes of near syncope parallel syncope? Am J Emerg Med. 2012 Jan;30(1):203-6.
5. Quinn J, McDermott D. Electrocardiogram findings in emergency department patients with syncope. Acad Emerg Med. 2011 Jul;18(7):714-8.
6. Shearer P, Riviello J. Generalized convulsive status epilepticus in adults and children: treatment guidelines and protocols. Emerg Med Clin North Am. 2011 Feb;29(1):51-64.
7. Jauch EC, Cucchiara B, Adeoye O, Meurer W, Brice J, Chan Y-F, Gentile N, Hazinski MF. Part 11: adult stroke: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S818–S828.
8. Meehan TJ, Bryant SM, Aks SE. Drugs of abuse: the highs and lows of altered mental states in the emergency department. Emerg Med Clin North Am. 2010 Aug;28(3):663-82.
9. Barton ED, Colwell CB, Wolfe T, Fosnocht D, Gravitz C, Bryan T, Dunn W, Benson J, Bailey J. Efficacy of intranasal naloxone as a needleless alternative for treatment of opioid overdose in the prehospital setting. J Emerg Med. 2005 Oct;29(3):265-71.
10. Vilke GM, Castillo EM, Ray LU, Murrin PA, Chan TC. Evaluation of pediatric glucose monitoring and hypoglycemic therapy in the field. Pediatr Emerg Care. 2005 Jan;21(1):1-5.
11. Brieger D, Eagle KA, Goodman SG, Steg PG, Budaj A, White K, Montalescot G; GRACE Investigators. Acute coronary syndromes without chest pain, an underdiagnosed and undertreated high-risk group: insights from the Global Registry of Acute Coronary Events. Chest. 2004 Aug;126(2):461-9.
12. Seger DL. Flumazenil--treatment or toxin. J Toxicol Clin Toxicol. 2004;42(2):209-16.
13. Bledsoe BE. No more coma cocktails. Using science to dispel myths & improve patient care. JEMS. 2002 Nov;27(11):54-60.
14. Hoffman RS, Goldfrank LR. The poisoned patient with altered consciousness. Controversies in the use of a 'coma cocktail'. JAMA. 1995 Aug 16;274(7):562-9.
15. Hoffman JR, Schriger DL, Luo JS. The empiric use of naloxone in patients with altered mental status: a reappraisal. Ann Emerg Med. 1991 Mar;20(3):246-52.

6F – DYSTONIC REACTIONS ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES

1. Vital signs
2. O_2
3. Dextrose for hypoglycemia
4. Benzodiazepine for sustained, active seizure (refer to 6D Seizure if applicable)

Evaluate differential diagnosis of AMS & treat per protocol(s):
- Hypoxemia (Shock)
- Head Injury
- Stroke
- Seizure
- Infection (Sepsis/ Meningitis)
- Medication/Alcohol
- Heat or Cold Illness

EMD

KEEP PATIENT FREE FROM INJURY HAZARDS
AVOID PLACING ANYTHING IN MOUTH

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, AS APPROPRIATE

DETERMINE BLOOD GLUCOSE
ADULT & PEDIATRIC WEIGHT ≥25 kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL, 1tube ORAL GLUCOSE (15g) PO
PEDIATRIC WEIGHT <25kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL, ½ tube ORAL GLUCOSE (7.5g) PO

EMT OR HIGHER LICENSE:
MEASURE END–TIDAL CO_2 & MONITOR CAPNOGRAPH (if equipped)

EMT-I85 / AEMT

IV ACCESS

ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

ADULT & PEDIATRIC WEIGHT ≥25 kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dl, D50 1 mL/kg IVP UP TO 50 mL
GLUCAGON 1 mg IM IF NO VASCULAR ACCESS OBTAINED
PEDIATRIC WEIGHT <25kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dl, D25 2 mL/kg IVP UP TO 50 mL
GLUCAGON 0.5 mg IM IF NO VASCULAR ACCESS OBTAINED
ADULT & PEDIATRIC: REPEAT DETERMINATION OF BLOOD GLUCOSE POST-DEXTROSE TREATMENT

PARAMEDIC

ADULT: DIPHENHYDRAMINE 50 mg IM/IVP
PEDIATRIC: DIPHENHYDRAMINE 1 mg/kg IM/IVP TO MAX OF 50 mg

IF NO IMPROVEMENT 15 MINUTES AFTER DEPHENHYDRAMINE ADMINISTRATION & MARKED MUSCLE SPASM/TONE:

ADULT: MIDAZOLAM 2.5 mg IVP/IM/IN **OR**
ADULT: DIAZEPAM 5 mg IVP **OR**
ADULT: LORAZEPAM 2 mg IVP/IM.

PEDIATRIC: MIDAZOLAM 0.1 mg/kg IM/IVP/IN TO MAX OF 2,5 mg **OR**
PEDIATRIC: DIAZEPAM 0.1 mg/kg TO MAX OF 5 mg IVP/IM **OR**
PEDIATRIC: LORAZEPAM 0.1 mg/kg TO MAX OF 2 mg IVP/IM

CONTINUOUS ASSESSMENT & TREATMENT OF SUSPECTED ETIOLOGY PER APPLICABLE PROTOCOL(S)
CONSULT OLMC IF ABOVE TREATMENT INEFFECTIVE
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
6F – Dystonic Reactions – Adult & Pediatric

1. Derinoz O, Caglar AA. Drug-induced movement disorders in children at paediatric emergency department: 'dystonia'. Emerg Med J. 2012 Mar 7. [Epub ahead of print].
2. Jacobsen RC. Out-of-hospital lingual dystonia resulting in airway obstruction. PrehospEmerg Care. 2011 Oct-Dec;15(4):537-40.
3. Clark GT, Ram S. Four oral motor disorders: bruxism, dystonia, dyskinesia and drug-induced dystonic extrapyramidal reactions. Dent Clin North Am. 2007 Jan;51(1):225-43, viii-ix.
4. Rodnitzky RL. Drug-induced movement disorders in children and adolescents. Expert Opin Drug Saf. 2005 Jan;4(1):91-102.
5. Barach E, Dubin LM, Tomlanovich MC, Kottamasu S. Dystonia presenting as upper airway obstruction. J Emerg Med. 1989 May-Jun;7(3):237-40.

SECTION 7

PSYCHIATRIC/BEHAVIORAL DISORDERS

7A - BEHAVIORAL DISORDERS ADULT & PEDIATRIC

TREATMENT PRIORITIES
1. Asses scene safety
2. Safety of self
3. Safety of public safety professionals
4. Safety of patient
5. Observe for uncontrolled agitation, combativeness, AMS impeding necessary medical care or pulling at necessary medical interventions (IV lines, endotracheal tubes)
6. Employ alternative methods to avoid physically retraining the patient
7. Retrain patient if alternatives fail and/or it is necessary to maintain necessary medical intervention or to carry out treatment protocols
8. Treat excited delirium

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

KEEP VIOLENT OR SUICIDAL PATIENT ON THE LINE.
IN VOLATILE/CRIMINAL SITUATIONS, FOLLOW APPLICABLE LAW ENFORCEMENT PROTOCOL.
FOR JUMPERS, NOTIFY LAW AND FIRE/RESCUE RESOURCES.

EMR / EMT

GENERAL SUPPORTIVE CARE – DO NOT LEAVE PATIENT ALONE
OBTAIN VITAL SIGNS
O_2 VIA NC or NRB AS APPROPRIATE
APPLY CARDIAC MONITOR (if equipped)

IF RESTRAINTS ARE REQUIRED USE SOFT RESTRAINTS and / or KERLIX
RESTRAIN PATIENT TO LONG SPINE BOARD OR ORTHOPEDIC SCOOP

DO NOT TRANSPORT PATIENTS
"SANDWICHED" BETWEEN TWO BACKBOARDS

DURING TRANSPORT OF PATIENTS IN POLICE INSTITUTED LOCKING RESTRAINTS, A POLICE OFFICER SHOULD EITHER ACCOMPANY THE PATIENT OR PROVIDE EMS PERSONNEL MEANS TO UNLOCK THE RESTRAINTS

DETERMINE BLOOD GLUCOSE
ADULT & PEDIATRIC WEIGHT ≥25 kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL, 1tube ORAL GLUCOSE (15g) PO
PEDIATRIC WEIGHT <25kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL, ½ tube ORAL GLUCOSE (7.5g) PO

EMT OR HIGHER LICENSE:
MEASURE END – TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY
(if equipped, **Mandatory use if pt intubated)

EMT - I85 / AEMT

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

DETERMINE BLOOD GLUCOSE
ADULT & PEDIATRIC WEIGHT ≥25 kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL, D50 1 mL/kg IVP UP TO 50 mL
GLUCAGON 1 mg IM IF NO VASCULAR ACCESS OBTAINED
PEDIATRIC WEIGHT <25 kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL, D25 2 mL/kg IVP UP TO 50mL
GLUCAGON 0.5 mg IM IF NO VASCULAR ACCESS OBTAINED
ADULT & PEDIATRIC: REPEAT DETERMINATION OF BLOOD GLUCOSE POST-DEXTROSE TREATMENT

PARAMEDIC

CHEMICAL RESTRAINT: SEE PROTOCOL 7C

CONSULT OLMCP IF UNCERTAIN OF ETIOLOGY AND TREATMENT PLAN FOR PSYCHIATRIC PROBLEM OR IF ADDITIONAL RESTRAINT MEASURES NEEDED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
7A – Behavior Disorder – Adult & Pediatric

1. Vilke GM, Bozeman WP, Dawes DM, Demers G, Wilson MP. Excited delirium syndrome (ExDS): treatment options and considerations. J Forensic Leg Med. 2012 Apr;19(3):117-21.
2. Weiss S, Peterson K, Cheney P, Froman P, Ernst A, Campbell M. The Use of Chemical Restraints Reduces Agitation in Patients Transported by Emergency Medical Service. J Emerg Med. 2011 Oct 28. [Epub ahead of print]
3. Vilke GM, Debard ML, Chan TC, Ho JD, Dawes DM, Hall C, Curtis MD, Costello MW, Mash DC, Coffman SR, McMullen MJ, Metzger JC, Roberts JR, Sztajnkrcer MD, Henderson SO, Adler J, Czarnecki F, Heck J, Bozeman WP. Excited Delirium Syndrome (ExDS): Defining Based on a Review of the Literature. J Emerg Med. 2011 Mar 24. [Epub ahead of print]
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5. Otahbachi M, Cevik C, Bagdure S, Nugent K. Excited delirium, restraints, and unexpected death: a review of pathogenesis. Am J Forensic Med Pathol. 2010 Jun;31(2):107-12.
6. Strote J, Verzemnieks E, Walsh M, Hutson HR. Use of force by law enforcement: an evaluation of safetyand injury. J Trauma. 2010 Nov;69(5):1288-93.
7. Rossi J, Swan MC, Isaacs ED. The violent or agitated patient. Emerg Med Clin North Am. 2010 Feb;28(1):235-56, x.
8. Coburn VA, Mycyk MB. Physical and chemical restraints. Emerg Med Clin North Am. 2009 Nov;27(4):655-67, ix.
9. Cheney PR, Gossett L, Fullerton-Gleason L, Weiss SJ, Ernst AA, Sklar D. Relationship of restraint use, patient injury, and assaults on EMS personnel. Prehosp Emerg Care. 2006 Apr-Jun;10(2):207-12.
10. Brice JH, Pirrallo RG, Racht E, Zachariah BS, Krohmer J. Management of the violent patient. Prehosp Emerg Care. 2003 Jan-Mar;7(1):48-55.

7B – PHYSICAL RESTRAINT ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:

1. Reducing likelihood of patient doing harm to self.
2. Reducing likelihood of patient doing harm to others (including EMS professionals).
3. Reducing likelihood of patient disrupting medically necessary interventions.
4. Patient requires/required chemical restraint per Protocol 7C.

Alternatives to physical restraint as outlined below are to be utilized so as to minimize the use of physical restraints. However, if alternatives to physical restraints are unsuccessful, then physical restraints will be applied in an effective and compassionate manner. Throughout the use of alternatives to physical restraint and physical restraint, the patient and the patient's concerned parties (family, friends, co-workers, etc.) shall be treated with respect and informed of the need for these procedures. This protocol is not intended to place EMS professionals at higher risk for injury. If personal safety is compromised or threatened during the course of patient care, appropriate law enforcement personnel should be summoned for assistance. If at any time questions arise as to appropriateness of using alternatives to physical restraint or physical restraint, OLMC should be consulted for direction.

Contraindications:

1. Patient (or patient's legal guardian or medical power of attorney) possesses medical decision making capacity and is refusing evaluation, treatment, and/or transport (in the absence of threatened or actual harm to self or others).
2. Patient is compliant with medically necessary interventions.
3. Reducing likelihood of patient doing harm to self and/or others and reducing likelihood of patient disrupting medically necessary interventions can be successfully accomplished with alternatives to physical restraint in the best judgment of the EMS professional(s) treating the patient.

PROTOCOL 7B: Physical Restraint – Adult & Pediatric, cont.

Technique:

The following steps shall be taken and documented in determining the need for physical restraints:

1. **Assessment of mental status** - Observe for uncontrolled agitation, combativeness, threats of violence to self or others, disorientation, altered mental status impeding medically necessary interventions, or pulling at necessary medical interventions (eg. oxygen, IV lines, endotracheal tubes).

2. **Alternatives to physical restraint**- Reassurance, support of concerned parties (family, friends, co-workers, etc.), reorientation, diversionary activity, explanation of illness, injury, and medically necessary interventions.

3. **Justification for physical restraint**- Failure of alternatives to physical restraint, reduce likelihood of patient harm to self, reduce likelihood of patient harm to others, enable medically necessary interventions per EMS protocols.

4. **Inform patient and concerned parties of physical restraint use.**

5. **Apply physical restraints.**

Restraints are to be soft and are not to impede airway patency, respiratory mechanics, or circulation. Patients will not be restrained prone unless an impaled object or airway patency necessitates such positioning. Restraints will be applied in an effective, yet compassionate manner. Every effort should be made to avoid injury to the patient during application of physical restraints.

Humane restraints that reduce potential for patient injury from the restraints are those made from roll gauze, soft leather, and those designed as single-patient use, disposable foam with cloth ties. Restraints are to be non-locking unless applied by law enforcement officers in appropriate circumstances and able to be released rapidly if patient condition mandates.

During treatment and transport of a patient in law enforcement-instituted restraints (including handcuffs), EMS professionals should monitor for and advocate for change in restraints that compromise airway patency, respiratory mechanics, or circulation. Patients will not be transported with wrists cuffed to ankles either directly or indirectly (also referred to as “hog-tying”). These positions have been shown to impair respiratory mechanics and pose significant obstacles to definitive airway management if required enroute. During transport of patients in law enforcement-instituted locking restraints, a law enforcement officer should either accompany the patient in the ambulance or provide the treating EMS professionals means to unlock the restraints. This policy allows rapid restraint release should the patient deteriorate to a condition requiring restraint release to properly treat.

Patients restrained using this protocol should generally be restrained to a backboard. This facilitates patient transfer in the emergency department and in the case of airway secretions or vomiting, enables rapid positioning of the patient to reduce aspiration. Patients will not be transported “sandwiched” between two backboards; this positioning impedes patient care and increases risk of aspiration.

PROTOCOL 7B: Physical Restraint – Adult & Pediatric, cont.

Once physical restraints are applied, they will be left in place until the patient is transferred to emergency department personnel. This policy prevents recurrent harm to self, harm to others, and disruption of intact medical devices and treatment. Despite assurance from the patient that they will comply with treatment, restraints are to be left in place unless a direct order from OLMC is given to release the physical restraints. Such an order must be clearly documented on the patient care form.

Medical Literature References
7B – Physical Restraints – Adult & Pediatric

1. Vilke GM, Bozeman WP, Dawes DM, Demers G, Wilson MP. Excited delirium syndrome (ExDS): treatment options and considerations. J Forensic Leg Med. 2012 Apr;19(3):117-21.
2. Vilke GM, Debard ML, Chan TC, Ho JD, Dawes DM, Hall C, Curtis MD, Costello MW, Mash DC, Coffman SR, McMullen MJ, Metzger JC, Roberts JR, Sztajnkrcer MD, Henderson SO, Adler J, Czarnecki F, Heck J, Bozeman WP. Excited Delirium Syndrome (ExDS): Defining Based on a Review of the Literature. J Emerg Med. 2011 Mar 24. [Epub ahead of print]
3. Otahbachi M, Cevik C, Bagdure S, Nugent K. Excited delirium, restraints, and unexpected death: a review of pathogenesis. Am J Forensic Med Pathol. 2010 Jun;31(2):107-12.
4. Rossi J, Swan MC, Isaacs ED. The violent or agitated patient. Emerg Med Clin North Am. 2010 Feb;28(1):235-56, x.
5. Coburn VA, Mycyk MB. Physical and chemical restraints. Emerg Med Clin North Am. 2009 Nov;27(4):655-67, ix.
6. Cheney PR, Gossett L, Fullerton-Gleason L, Weiss SJ, Ernst AA, Sklar D. Relationship of restraint use, patient injury, and assaults on EMS personnel. PrehospEmerg Care. 2006 Apr-Jun;10(2):207-12.
7. Brice JH, Pirrallo RG, Racht E, Zachariah BS, Krohmer J. Management of the violent patient. PrehospEmerg Care. 2003 Jan-Mar;7(1):48-55.

7C – CHEMICAL RESTRAINT ADULT & PEDIATRIC

TREATMENT PRIORITIES
1. Asses scene safety
2. Safety of self
3. Safety of public safety professionals
4. Safety of patient
5. Treat excited delirium

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMR / EMT

ASSIST IN PHYSICAL CONTROL OF PATIENT FOR PARAMEDIC TO ADMINISTER CHEMICAL RESTRAINT

USE ADEQUATE NUMBERS OF PUBLIC SAFETY PROFESSIONALS
TO MINIMIZE RISK OF INJURY TO SELF AND OTHERS

UNLESS SAFE TO DO SO, PERFORM THE FOLLOWING POST- CHEMICAL RESTRAINT:
GENERAL SUPPORTIVE CARE – DO NOT LEAVE PATIENT ALONE
OBTAIN VITAL SIGNS
O_2 VIA NC or NRB AS APPROPRIATE
APPLY CARDIAC MONITOR (if equipped)

EMT OR HIGHER LICENSE:
MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, **Mandatory use if pt intubated))

EMT-I85 / AEMT

IV ACCESS IF PT TEMPORARILY COOPERATIVE
DO NOT RISK SELF INJURY WITH NEEDLESTICK IN IV ACCESS IF PT COMBATIVE

PARAMEDIC

CHEMICAL RESTRAINT:

ALL PATIENTS REQUIRING CHEMICAL RESTRAINT ARE TO BE PHYSICALLY RESSTRAINED AS WELL

ADULT: MIDAZOLAM 0.1 mg/kg IM/IVP/IN/IOP TO MAX OF 5 mg. MAY REPEAT ONCE.
OR
ADULT: DIAZEPAM 5 mg IVP/IOP or 10 mg IM IF MIDAZOLAM NOT AVAILABLE. MAY REPEAT ONCE.
OR
ADULT: LORAZEPAM 2 mg IVP/IOP/IM IF MIDAZOLAM NOT AVAILABLE. MAY REPEAT ONCE.
(MIDAZOLAM STRONGLY PREFERRED DUE TO MOST RAPID ONSET OF ACTION OF BENZODIAZEPINE OPTIONS)
PLUS.
ADULT: HALOPERIDOL 5 mg IM

PEDIATRIC: MIDAZOLAM 0.1 mg/kg IM/IVP/IN/IOP TO MAX OF 5 mg.
OR
PEDIATRIC: DIAZEPAM 0.1 mg/kg TO MAX OF 5 mg IVP/IOP/IM FOR ACTIVE SEIZURE IF MIDAZOLAM NOT AVAILABLE.
OR
PEDIATRIC: LORAZEPAM 0.1 mg/kg TO MAX OF 2 mg IVP/IOP/IM FOR ACTIVE SEIZURE IF MIDAZOLAM NOT AVAILABLE.

CONSULT OLMCP IF UNCERTAIN OF ETIOLOGY AND TREATMENT PLAN FOR PSYCHIATRIC PROBLEM
OR IF ADDITIONAL CHEMICAL RESTRAINT MEASURES NEEDED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
7C – Chemical Restraint – Adult & Pediatric

1. Vilke GM, Bozeman WP, Dawes DM, Demers G, Wilson MP. Excited delirium syndrome (ExDS): treatment options and considerations. J Forensic Leg Med. 2012 Apr;19(3):117-21.
2. Weiss S, Peterson K, Cheney P, Froman P, Ernst A, Campbell M. The Use of Chemical Restraints Reduces Agitation in Patients Transported by Emergency Medical Service. J Emerg Med. 2011 Oct 28. [Epub ahead of print]
3. Wilson MP, Macdonald K, Vilke GM, Feifel D. A Comparison of the Safety of Olanzapine and Haloperidol in Combination with Benzodiazepines in Emergency Department Patients with Acute Agitation. J Emerg Med. 2011 May 19. [Epub ahead of print]
4. Vilke GM, Debard ML, Chan TC, Ho JD, Dawes DM, Hall C, Curtis MD, Costello MW, Mash DC, Coffman SR, McMullen MJ, Metzger JC, Roberts JR, Sztajnkrcer MD, Henderson SO, Adler J, Czarnecki F, Heck J, Bozeman WP. Excited Delirium Syndrome (ExDS): Defining Based on a Review of the Literature. J Emerg Med. 2011 Mar 24. [Epub ahead of print]
5. Strote J, Verzemnieks E, Walsh M, Hutson HR. Use of force by law enforcement: an evaluation of safety and injury. J Trauma. 2010 Nov;69(5):1288-93.
6. Ho JD, Dawes DM, Nelson RS, Lundin EJ, Ryan FJ, Overton KG, Zeiders AJ, Miner JR. Acidosis and catecholamine evaluation following simulated law enforcement "use of force" encounters. AcadEmerg Med. 2010 Jul;17(7):e60-8.
7. Otahbachi M, Cevik C, Bagdure S, Nugent K. Excited delirium, restraints, and unexpected death: a review of pathogenesis. Am J Forensic Med Pathol. 2010 Jun;31(2):107-12.
8. Rossi J, Swan MC, Isaacs ED. The violent or agitated patient. Emerg Med Clin North Am. 2010 Feb;28(1):235-56, x.
9. Coburn VA, Mycyk MB. Physical and chemical restraints. Emerg Med Clin North Am. 2009 Nov;27(4):655-67, ix.
10. Miller JL, Ashford JW, Archer SM, Rudy AC, Wermeling DP. Comparison of intranasal administration of haloperidol with intravenous and intramuscular administration: a pilot pharmacokinetic study. Pharmacotherapy. 2008 Jul;28(7):875-82.
11. Cheney PR, Gossett L, Fullerton-Gleason L, Weiss SJ, Ernst AA, Sklar D. Relationship of restraint use, patient injury, and assaults on EMS personnel. PrehospEmerg Care. 2006 Apr-Jun;10(2):207-12.
12. Brice JH, Pirrallo RG, Racht E, Zachariah BS, Krohmer J. Management of the violent patient. PrehospEmerg Care. 2003 Jan-Mar;7(1):48-55.

7D – EMERGENCY MENTAL HOLD ISSUES ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMS professionals should utilize this protocol and its principles and directives to promote and protect the safety of mentally ill patients, drug or alcohol dependent patients, and other involved parties who may be endangered by the patient's disturbed or altered psychological state to the extent of being subject to an immediate likelihood of serious harm.

Definitions:

1. "Drug Dependent Patient" for the purpose of this protocol means: A patient who is using a controlled substance as presently defined in Section 102 of the Federal Controlled Substances Act and who is in a state of psychic or physical dependence, or both, arising from administration of that controlled substance on an intermittent or continuous basis.

2. "Alcohol Dependent Patient" for the purpose of this protocol means: A patient who uses alcoholic beverages to an extent that it impairs mental or physical health, family life, occupational life, and potentially compromises the health and safety of the community.

3. "Mentally Ill Patient" for the purpose of this protocol means: A patient afflicted with a substantial disorder of thought, mood, perception, psychological orientation or memory that significantly impairs judgment, behavior, capacity to recognize reality or ability to meet the ordinary demands of life. Mental illness may be reflected in a sustained altered mentation secondary to chronic medical condition or prior physical injury.

4. "Immediate likelihood of serious harm" posed by patients either to self or others for the purpose of this protocol means:

    a) a substantial risk of physical harm to self, manifested by active threats of, or attempts at, suicide or intentional bodily harm; **OR**
    b) a substantial risk of physical harm to others manifested by active threats of, or attempts at, homicide or intentional bodily harm; **OR**
    c) actively placing others in reasonable fear of imminent violent behavior or serious physical harm; **OR**

PROTOCOL 7D: Emergency Mental Hold Issues – Adult & Pediatric, cont.

d) causing a prudent EMS professional to believe with reasonable certainty that without immediate medical treatment, severe physical impairment or injury would be sustained by the patient or other involved party as a result of the patient's apparent inability to prevent suicidal activity, homicidal activity, or significant risk of harm to self or others through distorted reality (eg. driving while acutely psychotic or clinically intoxicated).

Emergency Mental Hold Procedures:

1. Upon dispatch to and/or subsequent assessment of a patient representing, in the EMS professional's best judgment, "immediate likelihood of serious harm", the EMS professional should notify dispatch to immediately request the appropriate law enforcement authority. It is the duty of the responding law enforcement officer(s) to determine if the affected person appears to be mentally unstable, alcohol dependent or drug dependent to a degree that immediate emergency action is necessary to prevent the patient from harming self or others. If the law enforcement officer determines that immediate emergency action is necessary, under Oklahoma law, the law enforcement officer must take the person into protective custody. The law enforcement officer(s) can base their decision upon personal observation of the actions of the patient or upon the statement of either EMS professionals or other parties deemed credible.

2. If EMS professionals at the scene believe the patient to be actively mentally ill, alcohol dependent, and/or drug dependent to the extent of being subject to an "immediate likelihood of serious harm" to self or others, representing a medical need to be taken into protective custody by law enforcement, the primary assessing EMS professional shall fill out the "Individual's Affidavit for Emergency Detention" and submit to the law enforcement officer(s) at the scene as may be required to effect such detention.

3. If EMS professionals and the law enforcement officer(s) at the scene cannot reach agreement whether the patient is actively mentally ill, alcohol dependent, and/or drug dependent to the extent of representing an "immediate likelihood of serious harm" to self or others, representing a medical need to be taken into protective custody by law enforcement, the appropriate EMS supervisor(s) and corresponding law enforcement supervisor(s) should be contacted. Supervisor presence at the scene could be required to achieve consensus of actions that promote the patient's and others' safety.

4. If the EMS supervisor determines the patient is actively mentally ill, alcohol dependent, and/or drug dependent to the extent of representing an "immediate likelihood of serious harm" to self or others, representing a medical need to be taken into protective custody by law enforcement and therefore is in need of immediate medical attention, this shall be conveyed to the appropriate law enforcement supervisor. If the law enforcement supervisor does not subsequently place the patient on mental hold, notify the appropriate receiving hospital's On-Line Medical Control Physician (or the System EMS Medical Director) for formal physician consultation, complete an agency-specified Incident Report, and submit it to the Medical Director for review.

PROTOCOL 7D: Emergency Mental Hold Issues – Adult & Pediatric, cont.

5. If it appears that the affected person is mentally ill or suffers chronic altered mentation and does not require emergency medical attention, EMS personnel will stay on scene only until it can be reasonably determined that the person does not suffer from an apparent serious physical condition, illness, or injury requiring emergency medical attention and/or until the law enforcement officers at the scene indicate that they no longer require assistance from EMS.

<u>Emergency Detention (previously referred to as Emergency Order of Detention or EOD) Issues:</u>

1. An affidavit that is completed by anyone (including an EMS professional) who is concerned about the patient's safety or who witnessed concerned behavior that could impact the safety of others, that details the observations and impressions that serve as the basis for involuntary detention of the patient in the safety interests of the patient and others has been commonly referred to as an "EOD" or "Emergency Order of Detention". This is no longer used as a legal term. The correct terminology is a "third party statement".

2. The "third party statement" must have sufficiently detailed information to justify placing the patient, at least temporarily, into law enforcement custody. (eg. "suicidal" is not enough). A law enforcement officer can refuse to take a patient into custody if he or she determines there is insufficient written evidence contained within the "third party statement".

3. The "third party statement" is the legally recognized documentation that compels a patient to be placed into Emergency Detention (ED) in the safety interests of self and others until emergency psychiatric assessment (and stabilization when applicable) can be conducted. Medical facilities in Oklahoma that can conduct emergency psychiatric assessment and stabilization are referred to as "Emergency Detention (formerly EOD) designated facilities".

4. A patient that is under Emergency Detention by use of a "third party statement" cannot refuse transport to receive an appropriate physician evaluation. EMS professionals treating and transporting patients under Emergency Detention should not let the patient flee from EMS care and supervision, unless the patient poses an immediate, serious physical threat to the EMS professional(s). Utilize law enforcement officers, physical restraint, and if licensed as a paramedic, chemical restraint, as warranted to prevent patients under Emergency Detention from fleeing.

5. Once an appropriate physician, typically a psychiatrist, has evaluated the patient under Emergency Detention through use of a "third party statement", he or she may validate continued involuntary detention of the patient or may release the patient from further involuntary medical detention.

6. EMS professionals should work with their system Medical Director, local medical professionals, and local law enforcement officers to review applicable emergency mental hold issues and resources.

IN RE: THE PROTECTIVE CUSTODY OF:

_____

THIRD PARTY STATEMENT

I, _____ the undersigned being _____ years of age, declare: That on the _____ day of _____ 20____, I observed (name) _____

_____

at (location) _____ in _____ County, Oklahoma, and that at _____ o'clock ____m.

Statement of observation (describe activity or incident personally observed):

_____

_____

_____

_____

_____

_____

_____

_____

_____

That upon such basis, I have a reasonable belief that this person has a mental illness or is alcohol- or drug-dependent to a degree that immediate emergency action is necessary.

I, the undersigned attest to the above statement to be factual and true to the best of my knowledge and that I will testify to the above in court.

Any false statement given to the officer by the person upon whose statement of the officer relies shall be a misdemeanor and subject to the sanctions of Title 21 of the Oklahoma State Statute.

_____
Name (please print)

_____
Signature

_____

_____
Address

Medical Literature References
7D – Emergency Mental Hold Issues -Adult & Pediatric

1. Protocol expert consultant: Gerard Clancy, MD. President, University of Oklahoma - Tulsa. Department of Psychiatry, University of Oklahoma School of Community Medicine, Tulsa. Board certified in psychiatry by the American Board of Psychiatry and Neurology.
2. Protocol expert consultant: Lori Whelan, MD. Department of Emergency Medicine, University of Oklahoma School of Community Medicine, Tulsa. Board certified in emergency medicine by the American Board of Emergency Medicine.
3. Oklahoma Department of Mental Health and Substance Abuse Services. Accessed website on 6/25/12: www.ok.gov/odmhsas accessed on 6/25/12.
4. Oklahoma State Law Title 43A.Mental Health. Accessed website on 6/25/12: http://www.ok.gov/odmhsas/documents/2010%20-%2043A.pdf.

SECTION 8

TOXICOLOGIC/POISONINGS

8A - POISONINGS-GENERAL MANAGEMENT ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Self/Others/Scene Safety
2. Vital signs
3. Oxygenation/Ventilation
4. Identify & treat toxin
5. Poison Center/OLMC consult if needed
6. Manage shock, altered mental status, seizures, arrhythmias; CO Poisoning per specific protocol
7. Transport ASAP

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
DO NOT MOVE THE PATIENT UNLESS IN DANGER.
OPEN AIRWAY IF NOT ALERT AND INEFFECTIVE BREATHING.
DETERMINE NUMBER OF PATIENTS INVOLVED
DECIDE IF ADDITIONAL RESOURCES ARE NEEDED

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (if equipped)
TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT

EMT OR HIGHER LICENSE:

MEASURE END – TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, **Mandatory use if pt intubated)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT-I85 / AEMT

IV ACCESS
ADULT: INTUBATE IF INDICATED; DO NOT INTUBATE PATIENTS WITH RAPIDLY REVERSIBLE TOXICOLOGY ETIOLOGY (eg. OPIATES)

ADVANCED EMT OR HIGHER LICENSE:

TOXINS/DRUG OVERDOSE – SUSPECTED NARCOTIC/OPIATE – APNEIC/AGONALLY BREATHING (see opiate toxidrome in Protocol 8B)
ADULT: NALOXONE 2 mg IVP/IOP/IN MAY REPEAT ONCE
PEDIATRIC: NALOXONE 0.5 mg IVP/IOP/IN, MAY REPEAT TO MAX OF 2 mg

TOXINS/DRUG OVERDOSE – SUSPECTED NARCOTIC/OPIATE – INEFFECTIVE BREATHING ACTIVITY (see opiate toxidrome in Protocol 8B)
ADULT & PEDIATRIC: NALOXONE 0.5 mg IVP/IOP/IN, MAY REPEAT TO MAX OF 2 mg
USE NALOXONE TO RESTORE EFFECTIVE BREATHING; AVOID EXCESSIVE DOSING TO PREVENT WITHDRAWAL

PARAMEDIC

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED

USE OF ACTIVATED CHARCOAL FOR ACUTE INGESTED POISONS, (i.e., Acetaminophen, ASA, TCA, Barbiturates)
ADULT/PEDIATRIC: ACTIVATED CHARCOAL 1 g/kg PO (OLMC ORDER – CONSULT FOR TRANSPORT TIMES EXCEEDING 30 MINS)

TOXINS/DRUG OVERDOSE - SUSPECTED ORGANOPHOSPHATE (see cholinergic toxidrome in Protocol 8B)
ADULT: ATROPINE 2 mg IVP/IOP/IM, USE IVP FOR MORE SEVERE PRESENTATIONS. REPEAT EVERY 3-5 MINS IF SYMPTOMS PROGRESSIVE
PEDIATRIC: ATROPINE 0.05 mg/kg IVP/IOP/IM, USE IVP FOR MORE SEVERE PRESENTATIONS. MINIMUM DOSE 0.1 mg. OLMC FOR REPEAT.
ADULT/PEDIATRIC (> 12 years of age): PRALIDOXIME CHLORIDE 600 mg (1 AUTOINJECTOR) IM, MAY REPEAT TWICE FOR A TOTAL OF 1800 mg; ADMINISTER EACH DOSE 15 MINUTES APART FOR MILD SYMPTOMS OR IN RAPID SUCCESSION FOR MODERATE TO SEVERE SYMPTOMS

TOXINS/DRUG OVERDOSE - SUSPECTED TRICYCLIC ANTIDEPRESSANT (VENTRICULAR DYSRHYTHMIAS, SEIZURES) (see anticholinergic toxidrome in Protocol 8B)
ADULT/PEDIATRIC: SODIUM BICARBONATE 1 mEq/kg IVP/IOP MAX DOSE 50 mEq

TOXINS/DRUG OVERDOSE - SUSPECTED STIMULANT (SEVERE AGITATION, HTN, TACHYCARDIA, DIAPHORESIS) (see hallucinogenic and sympathomimetic toxidromes in Protocol 8B)
ADULT: MIDAZOLAM 0.1mg/kg IVP/IN/IM TO MAX 5 mg OR DIAZEPAM 2.5-5 mg IVP OR LORAZEPAM 1-2 mg IVP/IM
PEDIATRIC: OLMCP ORDER ONLY

TOXINS/DRUG OVERDOSE - SUSPECTED CALCIUM CHANNEL BLOCKER
ADULT: CALICUM CHLORIDE 10 mg/kg IVP/IOP MAX DOSE 1 gram

TOXINS/DRUG OVERDOSE - SUSPECTED BETA-BLOCKER
ADULT: GLUCAGON 1 mg IVP/IOP
PEDIATRIC: GLUCAGON 0.5 mg IVP/IOP

CONSULT OLMC IF ABOVE TREATMENT INEFFECTIVE FOR TOXINS/DRUG OVERDOSE ETIOLOGY
Poison Information Center Specialists are authorized to direct medical care related to the medical toxicology and/or hazardous material exposure aspects of patient care if contacted for directives
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
8A - Poisonings–General Management - Adult & Pediatric

1. VandenHoek TL, Morrison LJ, Shuster M, Donnino M, Sinz E, Lavonas EJ, Jeejeebhoy FM, Gabrielli A. Part 12: cardiac arrest in special situations: 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Circulation. 2010;122(suppl 3):S829–S861.
2. Shannon MW. Emergency Management of Poisoning: A General Approach to Poisoning. In: Shannon MW, Borron SW, Burns MJ, eds. Haddad and Winchester's Clinical Management of Poisoning and Drug Overdose. 4th Ed. Philadelphia, PA: Saunders Elsevier; 2007: 13-30.
3. Eldridge DL, Van Eyk J, Kornegay C. Pediatric toxicology. Emerg Med Clin North Am. 2007 May;25(2):283-308.
4. Mokhlesi B, Corbridge T. Toxicology in the critically ill patient. Clin Chest Med. 2003 Dec;24(4):689-711.
5. Isbister GK, Dawson AH, Whyte IM. Feasibility of prehospital treatment with activated charcoal: Who could we treat, who should we treat? Emerg Med J. 2003 Jul;20(4):375-8.

8B - TOXIDROMES ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Toxidromes as a Diagnostic Guide in Suspected Overdose

Toxidrome	Signs and symptoms	Vital sign	Classic agents
anticholinergic	delirium, flushed skin, dilated pupils, urinary retention, decreased bowel sounds, memory loss, seizures (mnemonic: "hot as a hare, dry as a bone, red as a beet, blind as a bat, mad as a hatter")	tachycardia hyperthermia hypertension	atropine antihistamines scopolamine tricyclic antidepressants
cholinergic	confusion, weakness, salivation, lacrimation, urination, defecation, gastrointestinal motility, emesis, diaphoresis, muscle fasciculations, miosis, seizures, "Killer Bs": bradycardia, bronchorrhea, bronchospasm	bradycardia hypothermia tachypnea	organophosphates carbamates
hallucinogenic	disorientation, hallucinations, visual illusions, panic reaction, moist skin, hyperactive bowel sounds, seizures	tachycardia tachypnea hypertension	phencyclidine lysergic acid diethylamide cannabis
opiate/narcotic	altered mental status, unresponsiveness, miosis, shock, decreased respiration	bradypnea bradycardia hypothermia hypotension	dextromethorphan opiates: morphine propoxyphene
sedative/hypnotic	coma, stupor, confusion, sedation, CNS dsyfunction	apnea	ethanol barbiturates benzodiazepines anticonvulsants
sympathomimetic	delusions, paranoia, diaphoresis, piloerection, mydriasis, hyperreflexia, seizures, anxiety	tachycardia hypertension hyperthermia	cocaine amphetamines methamphetamine phenylpropanolamine ephedrine pseudoephedrine

Medical Literature References
8B - Toxidromes- Adult & Pediatric

1. Florida Poison Information Center, Jacksonville. Toxidromes. FPICjax.org. http://www.fpicjax.org/toxidromes.htm. Accessed June 17, 2012.
2. Goldstein S. Four steps to diagnosing drug overdose. Emergency Medicine Magazine. emedmag.com. April 2009:17-22.
3. Shannon MW. Emergency Management of Poisoning: A General Approach to Poisoning. In: Shannon MW, Borron SW, Burns MJ, eds. Haddad and Winchester's Clinical Management of Poisoning and Drug Overdose. 4th Ed. Philadelphia, PA: Saunders Elsevier; 2007: 13-30.
4. Mokhlesi B, Corbridge T. Toxicology in the critically ill patient. Clin Chest Med. 2003 Dec;24(4):689-711.

8C – OKLAHOMA POISON CONTROL CENTER USE

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:

A. Real-time consultation on toxic severity of exposure/inhalation/ingestion/snakebites.
B. Real-time consultation regarding no/minimal toxicity exposures for patient follow-up contact and self-treatment advice.
C. Real-time consultation regarding needed hospital resources for patient toxicity.
D. Identification of pills (using imprint letters/numbers on pills).
E. Product ingredient identification and toxic severity potential.

Contraindications:

None

Technique:

To contact the Oklahoma Poison Control Center in Oklahoma City:

Healthcare Professional Access Number: 1-877-271-6998

When calling, identify yourself by name, EMS certification level, and agency/apparatus identification. Have as much patient information and substance/exposure/snake information possible readily available to share with the poison center specialist.

The University of Oklahoma College of Pharmacy administers all operations of the Oklahoma Poison Control Center in cooperation with The Children's Hospital at OU Medical Center.

Calls are answered 24-hours a day by pharmacists and nurses intensively trained in clinical toxicology and designated as specialists in poison information.

8D - ACUTE ALLERGIC REACTIONS ADULT & PEDIATRIC

TREATMENT PRIORITIES
1. Vital signs
2. Oxygen administration
3. Epinephrine for anaphylaxis
4. Bronchodilator for bronchospasm

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
DO NOT MOVE THE PATIENT UNLESS IN DANGER
OPEN AIRWAY IF NOT ALERT AND INEFFECTIVE BREATHING

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR (if equipped)
ASSIST PT WITH PT'S OWN ALBUTEROL INHALER/NEBULIZER (when applicable)

EMT OR HIGHER LICENSE:
FOR ANAPHYLAXIS ONLY
ADULT: EPINEPHRINE 1:1000 0.3 mg (0.3 mL) AUTOINJECTOR INTRAMUSCULAR INJECTION IN THIGH
PEDIATRIC: EPINEPHRINE 1:1000 0.15 mg (0.15 mL) AUTOINJECTOR INTRAMUSCULAR INJECTION IN THIGH
OLMC ORDER ONLY FOR EPINEPHRINE IF PT ≥ 50 YEARS OLD, HEART ILLNESS HISTORY, OR BLOOD PRESSURE > 140/90 mmHg

MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, ** Mandatory use if pt intubated)
ADULT: APPLY Bi/CPAP IF INDICATED (if equipped)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

ADULT & PEDIATRIC WEIGHT ≥15 kg: NEBULIZED ALBUTEROL 5mg & IPRATROPIUM BROMIDE 0.5 mg
PEDIATRIC WEIGHT <15 kg: NEBULIZED ALBUTEROL 2.5mg & IPRATROPIUM BROMIDE 0.25 mg
MAY REPEAT ALBUTEROL ENROUTE X 2 AS NEEDED

EMT- I85 / AEMT

ADULT: INTUBATE IF INDICATED
IV ACCESS

ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA
REPEAT UP TO 60mL/kg IF SYS BP REMAINS < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

MILD REACTION (RASH, ITCH, HIVES) ANTIHISTAMINE
ADULT: DIPHENHYDRAMINE 50 mg IM/IVP
PEDIATRIC: DIPHENHYDRAMINE 1 mg/kg IM/IVP TO MAX OF 50 mg

MODERATE REACTION (SOB, WHEEZING) ANTIHISTAMINE + BRONCHODILATOR + STEROID
DIPHENHYDRAMINE ADMINISTRATION AS IN MILD REACTION & BRONCHODILATOR ADMINISTRATION AS IN EMT ABOVE
ADULT: METHYLPREDNISOLONE 125 mg IM/IVP
PEDIATRIC: METHYLPREDNISOLONE 2 mg/kg IM/IVP, MAX 125 mg

SEVERE REACTION/ANAPHYLAXIS (ANY MILD/MODERATE SYMPTOMS+SYS BP <100 mmHg ADULT OR < (70 + 2x age in years) mmHg PEDIATRIC VASOCONSTRICTOR + ANTIHISTAMINE + BRONCHODILATOR + STEROID
ADULT: EPINEPHRINE 1:1000 0.3 mg (0.3 mL) IM
PEDIATRIC: EPINEPHRINE 1:1000, 0.01 mg/kg, IM NOT TO EXCEED 0.3 mg
DIPHENHYDRAMINE ADMINISTRATION & BRONCHODILATOR ADMINISTRATION AS IN MILD REACTION; STEROID ADMINISTRATION AS ABOVE
IF REFRACTORY ANAPHYLAXIS, ADMINISTER INTRAVASCULAR EPINEPHRINE 1:10,000
ADULT: EPINEPHRINE 1:10,000 1 mg SLOW IV/IOP (OVER 3 MINUTES)
PEDIATRIC: EPINEPHRINE 1:10,000, 0.01 mg/kg SLOW IV/IOP (OVER 3 MINUTES)
ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED
CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S); TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
8D – Allergic Reactions - Adult & Pediatric

1. Jacobsen RC, Toy S, Bonham AJ, Salomone JA, Ruthstrom J, Gratton M. Anaphylaxis Knowledge among Paramedics: Results of a National Survey. PrehospEmerg Care. 2012 Jun 19. [Epub ahead of print]
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12. Markenson D, Foltin G, Tunik M, Cooper A, Treiber M, Caravaglia K. Albuterol sulfate administration by EMT-basics: results of a demonstration project. PrehospEmerg Care. 2004 Jan-Mar;8(1):34-40.
13. Delbridge T, Domeier R, Key CB. Prehospital asthma management. PrehospEmerg Care. 2003 Jan-Mar;7(1):42-7.
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8E – SNAKEBITES – PIT VIPERS (RATTLESNAKES, COPPERHEADS, & MOCASSINS) (CROTALINAE ENVENOMATION) ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES
1. Vital signs
2. OK Poison Center consult
3. Epinephrine for anaphylaxis
4. Appropriate destination per OK Poison Center consult

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
MOVE AWAY FROM SNAKE(S) IF ABLE
OPEN AIRWAY IF NOT ALERT AND INEFFECTIVE BREATHING

EMR / EMT

GENERAL SUPPORTIVE CARE – MARK EDGE OF SWELLING/TENDERNESS EVERY 15 MINS TO DETERMINE SYMPTOM PROGRESSION
OBTAIN VITAL SIGNS & ADMINISTER O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
IMMOBILIZE/ELEVATE AND AVOID JOINT FLEXION IN EXTREMITY BITTEN TO MINIMIZE SWELLING OF EXTREMITY
DO NOT CUT THE BITE SITE OR ATTEMPT TO "EXTRACT THE VENOM" FROM BITE SITE WITH SUCTION/VACUUM DEVICES
CONSULT OKLAHOMA POISON CONTROL CENTER PER PROTOCOL 8C – DESCRIBE SNAKE APPEARANCE/TYPE AS BEST ABLE
APPLY CARDIAC MONITOR (if equipped)

EMT OR HIGHER LICENSE:

FOR ANAPHYLAXIS ONLY (ANAPHYLAXIS FROM SNAKEBITE IS RARE):
ADULT: EPINEPHRINE 1:1000 0.3 mg (0.3 mL) AUTOINJECTOR INTRAMUSCULAR INJECTION IN THIGH
PEDIATRIC: EPINEPHRINE 1:1000 0.15 mg (0.15 mL) AUTOINJECTOR INTRAMUSCULAR INJECTION IN THIGH
OLMC ORDER ONLY FOR EPINEPHRINE IF PT ≥ 50 YEARS OLD, HEART ILLNESS HISTORY, OR BLOOD PRESSURE > 140/90 mmHg

MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, ** Mandatory use if pt intubated)
ADULT: APPLY Bi/CPAP IF INDICATED (if equipped)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT- I85 / AEMT

ADULT: INTUBATE IF INDICATED
IV ACCESS

ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA
REPEAT UP TO 60mL/kg IF SYS BP REMAINS < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ANTIEMETIC (IF REQUIRED); **ADULT:** ONDANSETRON 4 mg IVP/ODT. MAY REPEAT ONCE IN 10 MINUTES
PEDIATRIC: ONDANSETRON 0.1 mg/kg IVP TO A MAXIMUM SINGLE DOSE OF 4 mg; IF AGE > 2 years, MAY GIVE ONDANSETRON 4 mg ODT

ANALGESIA (IF REQUIRED); OPIATE USE, ADULT MUST HAVE SYS BP ≥ 100 mmHg; PEDIATRIC MUST HAVE SYS BP ≥ (70 + 2x age in years) mmHg
ADULT: FENTANYL 1 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 100 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 3 mcg/kg or 250 mcg WHICHEVER IS LESSER.
OR
ADULT: MORPHINE SULFATE 2 - 4 mg SLOW IVP, MAY REPEAT 2 - 4 mg EVERY 5 MINUTES TO A TOTAL OF 10 mg.
OR
ADULT: HYDROMORPHONE 0.5 - 1 mg SLOW IVP, MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 2 mg.

PEDIATRIC: OLMCP ORDER ONLY FOR OPIATE ANALGESIA

SEVERE REACTION/ANAPHYLAXIS (ANY MILD/MODERATE SYMPTOMS+SYS BP <100 mmHg ADULT OR < (70 + 2x age in years) mmHg PEDIATRIC
ADULT: EPINEPHRINE 1:1000 0.3 mg (0.3 mL) IM
PEDIATRIC: EPINEPHRINE 1:1000, 0.01 mg/kg, IM NOT TO EXCEED 0.3 mg
IF REFRACTORY ANAPHYLAXIS, ADMINISTER INTRAVASCULAR EPINEPHRINE 1:10,000
ADULT: EPINEPHRINE 1:10,000 1 mg SLOW IV/IOP (OVER 3 MINUTES)
PEDIATRIC: EPINEPHRINE 1:10,000, 0.01 mg/kg SLOW IV/IOP (OVER 3 MINUTES)
ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED
CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S); TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
8E– Snakebites (Crotalinae Envenomation)- Adult & Pediatric

1. Protocol expert consultant: William Banner, MD, PhD. Medical Director, Oklahoma Poison Control Center, Oklahoma City. Board certified in medical toxicology by the American Board of Medical Toxicology. Board certified in pediatrics and pediatric critical care medicine by the American Board of Pediatrics.
2. Protocol expert consultant: Boyd Burns, DO. Department of Emergency Medicine, University of Oklahoma School of Community Medicine, Tulsa. Board certified in emergency medicine by the American Board of Emergency Medicine.
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9. Singletary EM, Rochman AS, Bodmer JC, Holstege CP.Envenomations.Med Clin North Am. 2005 Nov;89(6):1195-224.

8F – BEE/WASP STINGS (HYMENOPTERA ENVENOMATION) ADULT & PEDIATRIC

TREATMENT PRIORITIES
1. Vital signs
2. Oxygen administration
3. Epinephrine for anaphylaxis
4. Bronchodilator for bronchospasm

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
MOVE AWAY FROM STINGING INSECTS IF ABLE
OPEN AIRWAY IF NOT ALERT AND INEFFECTIVE BREATHING

EMR / EMT

GENERAL SUPPORTIVE CARE – REMOVE STINGER(S) WITHOUT SQUEEZING IF STILL EMBEDDED IN SKIN
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR (if equipped)
ASSIST PT WITH PT'S OWN ALBUTEROL INHALER/NEBULIZER (when applicable)

EMT OR HIGHER LICENSE:
FOR ANAPHYLAXIS ONLY
ADULT: EPINEPHRINE 1:1000 0.3 mg (0.3 mL) AUTOINJECTOR INTRAMUSCULAR INJECTION IN THIGH
PEDIATRIC: EPINEPHRINE 1:1000 0.15 mg (0.15 mL) AUTOINJECTOR INTRAMUSCULAR INJECTION IN THIGH
OLMC ORDER ONLY FOR EPINEPHRINE IF PT ≥ 50 YEARS OLD, HEART ILLNESS HISTORY, OR BLOOD PRESSURE > 140/90 mmHg

MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, ** Mandatory use if pt intubated)
ADULT: APPLY Bi/CPAP IF INDICATED (if equipped)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

ADULT & PEDIATRIC WEIGHT ≥15 kg: NEBULIZED ALBUTEROL 5mg & IPRATROPIUM BROMIDE 0.5 mg
PEDIATRIC WEIGHT <15 kg: NEBULIZED ALBUTEROL 2.5mg & IPRATROPIUM BROMIDE 0.25 mg
MAY REPEAT ALBUTEROL ENROUTE X 2 AS NEEDED

EMT- I85 / AEMT

ADULT: INTUBATE IF INDICATED
IV ACCESS

ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA
REPEAT UP TO 60mL/kg IF SYS BP REMAINS < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

MILD REACTION (RASH, ITCH, HIVES) ANTIHISTAMINE
ADULT: DIPHENHYDRAMINE 50 mg IM/IVP
PEDIATRIC: DIPHENHYDRAMINE 1 mg/kg IM/IVP TO MAX OF 50 mg

MODERATE REACTION (SOB, WHEEZING) ANTIHISTAMINE + BRONCHODILATOR + STEROID
DIPHENHYDRAMINE ADMINISTRATION AS IN MILD REACTION & BRONCHODILATOR ADMINISTRATION AS IN EMT ABOVE
ADULT: METHYLPREDNISOLONE 125 mg IM/IVP
PEDIATRIC: METHYLPREDNISOLONE 2 mg/kg IM/IVP, MAX 125 mg

SEVERE REACTION/ANAPHYLAXIS (ANY MILD/MODERATE SYMPTOMS+SYS BP <100 mmHg ADULT OR < (70 + 2x age in years) mmHg PEDIATRIC
VASOCONSTRICTOR + ANTIHISTAMINE + BRONCHODILATOR + STEROID
ADULT: EPINEPHRINE 1:1000 0.3 mg (0.3 mL) IM
PEDIATRIC: EPINEPHRINE 1:1000, 0.01 mg/kg, IM NOT TO EXCEED 0.3 mg
DIPHENHYDRAMINE ADMINISTRATION & BRONCHODILATOR ADMINISTRATION AS IN MILD REACTION; STEROID ADMINISTRATION AS ABOVE
IF REFRACTORY ANAPHYLAXIS, ADMINISTER INTRAVASCULAR EPINEPHRINE 1:10,000
ADULT: EPINEPHRINE 1:10,000 1 mg SLOW IV/IOP (OVER 3 MINUTES)
PEDIATRIC: EPINEPHRINE 1:10,000, 0.01 mg/kg SLOW IV/IOP (OVER 3 MINUTES)
ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED
CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S); TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
8F– Bee/Wasp Stings (Hymenoptera Envenomation)-Adult & Pediatric

1. Jacobsen RC, Toy S, Bonham AJ, Salomone JA, Ruthstrom J, Gratton M. Anaphylaxis Knowledge among Paramedics: Results of a National Survey. PrehospEmerg Care. 2012 Jun 19. [Epub ahead of print]
2. Jacobsen RC, Millin MG. The use of epinephrine for out-of-hospital treatment of anaphylaxis: resource document for the National Association of EMS Physicians position statement. PrehospEmerg Care. 2011 Oct-Dec;15(4):570-6.
3. National Association of EMS Physicians. The use of epinephrine for out-of-hospital treatment of anaphylaxis. PrehospEmerg Care. 2011 Oct-Dec;15(4):544.
4. Simons FE, Ardusso LR, Bilò MB, El-Gamal YM, Ledford DK, Ring J, Sanchez-Borges M, Senna GE, Sheikh A, Thong BY; World Allergy Organization. World Allergy Organization anaphylaxis guidelines: summary. J Allergy ClinImmunol. 2011 Mar;127(3):587-93.e1-22.
5. VandenHoek TL, Morrison LJ, Shuster M, Donnino M, Sinz E, Lavonas EJ, Jeejeebhoy FM, Gabrielli A. Part 12: cardiac arrest in special situations: 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Circulation. 2010;122(suppl 3):S829–S861.
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8G – HAZARDOUS MATERIALS RESPONSE

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

This protocol contains generally accepted principles related to EMS response and activity relating to suspected or actual hazardous materials incidents. The overriding principle is safety, with an emphasis on minimizing, preferably preventing, further hazardous materials exposures and related illness.

Specific practices for individual hazardous material substances are beyond the capability of a general principle protocol and the EMS professional is directed to utilize hazardous material specialists within local fire services as well as hazardous material information found in resources such as:

1) Emergency Response Guidebook (ERG – 2012 edition if available), developed jointly by the US Department of Transportation (DOT), Transport Canada, and the Secretariat of Communications and Transportation of Mexico.

2) Wireless Information System for Emergency Responders (WISER), maintained at the US National Library of Medicine Specialized Information Services. The webpage for WISER is http://wiser.nlm.nih.gov/ and according to this website, "WISER is available for download as a standalone application on Microsoft Windows PCs, Apple iPhone and iPod Touch, Google Android devices, Windows Mobile devices, BlackBerry devices, Palm OS PDAs, and via WebWISER.

When responding to individuals in hazardous materials environment(s) and/or contaminated by hazardous materials, real danger exist that EMS professionals, public safety apparatus, and hospitals may be unable to effectively function if not protected from this contamination. Therefore, appropriate efforts must be made to protect the already apparent patient(s), responding public safety professionals, at-risk citizenry, and the emergency healthcare system from further contamination.

Treatment by unprotected or inappropriately protected EMS professionals should not be attempted until appropriate protective measures can be accomplished and the patient is decontaminated or otherwise determined non-toxic by appropriate authority (eg. Fire Department Hazardous Materials specialist, Oklahoma Poison Control Center specialist, and/or on-line medical control physician).

Protocol 8G: Hazardous Materials Response, cont.

Initial measures of protection for EMS professionals and equipment:

EMS professionals that are initially responding and arriving toward the incident location should perform the following:

1. Park in an anticipated safe area (typically upwind/uphill unless otherwise directed by Hazardous Materials specialists responding or already on-scene).

2. Determine and advise the appropriate communications center of the following (if not previously known):

    a) The exact location of the incident.
    b) The type of incident (transportation accident, fire, explosion, etc.).
    c) Identification/nature of the hazardous materials, if known.
    d) Environmental conditions (estimated wind direction and speed).
    e) Recommended routes to and from the location.
    f) Staging area.
    g) Control line (perimeter) established or recommended to be established by fire service and/or law enforcement professionals
    h) Approximate number of patients (actual number preferred if known).
    i) Number of ambulances needed (estimated transport resources).

3. **DO NOT** rush into a suspected hazardous/contaminated situation until appropriate safety measures are accomplished. If additional public safety professionals have not yet arrived, generally accepted safe practices include:

    a) Do not drive any further into the area. Stay upwind and uphill.
    b) Establish a control line at least 300 feet from the incident and stay outside of it.
    c) Tell approaching persons to stop where they are.
    d) Designate a refuge area for victims already inside the control line and direct those ambulatory to this refuge area.

Additional measures of protection for EMS professionals and equipment:

1. Whenever possible, use portable or disposable medical equipment for treating hazardous materials victims. Check with local policy, but in general a safe practice is to leave any potentially contaminated equipment with the Hazardous Materials team to coordinate decontamination of any potentially contaminated equipment.

2. Open any windows to the patient compartment of the ambulance. Dangerous concentrations of chemicals can develop when unintentionally contaminated victims or rescuers are in the unventilated patient compartment of an ambulance.

3. After decontaminated patients have been treated and/or transported to the emergency department, the EMS professionals should be formally evaluated by emergency health care providers at an emergency department if exhibiting unusual signs or symptoms consistent with hazardous materials exposure since participating in the incident.

Medical Literature References
8G – Hazardous Materials Response

1. Emergency Response Guidebook. Website accessed 6/27/12 at: http://phmsa.dot.gov/hazmat/library/erg
2. Wireless Information System for Emergency Responders. Website accessed 6/27/12 at: http://wiser.nlm.nih.gov/

SECTION 9

MEDICAL

9A ABDOMINAL PAIN/NAUSEA/VOMITING/DIARRHEA ADULT & PEDIATRIC

TREATMENT PRIORITIES
1. Supportive care
2. IVF if needed for hypotension
3. Antiemetic for active vomiting

EMD

ADVISE TO REST IN COMFORTABLE POSITION
ADVISE NO FOOD OR DRINK
ADVISE TO AVOID MOVEMENT UNLESS NECESSARY

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMR | **EMT**

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O2 VIA NC OR NRB AS APPROPRIATE

EMT-I85 | **AEMT**

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ANTIEMETIC (IF REQUIRED)
ADULT: ONDANSETRON 4 mg IVP/ODT. MAY REPEAT ONCE IN 10 MINUTES

PEDIATRIC: ONDANSETRON 0.1 mg/kg IVP TO A MAXIMUM SINGLE DOSE OF 4 mg
IF AGE >2 years, MAY GIVE ONDANSETRON 4 mg ODT

ANALGESIA (IF REQUIRED)
FOR OPIATE USE, ADULT MUST HAVE SYS BP ≥ 100 mmHg; PEDIATRIC MUST HAVE SYS BP ≥ (70 + 2x age in years) mmHg

ADULT: FENTANYL 1 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 100 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 3 mcg/kg or 250 mcg WHICHEVER IS LESSER.
OR
ADULT: MORPHINE SULFATE 2 - 4 mg SLOW IVP, MAY REPEAT 2 - 4 mg EVERY 5 MINUTES TO A TOTAL OF 10 mg.
OR
ADULT: HYDROMORPHONE 0.5 - 1 mg SLOW IVP .
MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 2 mg.

PEDIATRIC: OLMCP ORDER ONLY

OLMCP CONSULT IF FURTHER ANALGESIA REQUIRED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
9A – Abdominal Pain/Nausea/Vomiting/Diarrhea – Adult& Pediatric

1. Salvucci AA, Squire B, Burdick M, Luoto M, Brazzel D, Vaezazizi R. Ondansetron is safe and effective for prehospital treatment of nausea and vomiting by paramedics. Prehosp Emerg Care. 2011 Jan-Mar;15(1):34-8.
2. Yuan Y, Chen JY, Guo H, Zhang Y, Liang DM, Zhou D, Zhao H, Lin F.Relief of abdominal pain by morphine without altering physical signs in acute appendicitis. Chin Med J (Engl). 2010 Jan 20;123(2):142-5.
3. Sharwood LN, Babl FE. The efficacy and effect of opioid analgesia in undifferentiated abdominal pain in children: a review of four studies. Paediatr Anaesth. 2009 May;19(5):445-51.
4. Warden CR, Moreno R, Daya M. Prospective evaluation of ondansetron for undifferentiated nausea and vomiting in the prehospital setting. Prehosp Emerg Care. 2008 Jan-Mar;12(1):87-91.
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9B – FEVER ADULT & PEDIATRIC

TREATMENT PRIORITIES
1. Supportive care
2. IVF if neeed for hypotension
3. Vasopressor if needed for septic shock refractory to IVF

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

ADVISE TO REST IN COMFORTABLE POSITION
ADVISE NO FOOD OR DRINK
ADVISE TO AVOID MOVEMENT UNLESS NECESSARY

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O2 VIA NC OR NRB AS APPROPRIATE

EMT-I85 / AEMT

IV/IO ACCESS IF INDICATED
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ANTIEMETIC (IF REQUIRED)
ADULT: ONDANSETRON 4 mg IVP/ODT. MAY REPEAT ONCE IN 10 MINUTES

PEDIATRIC: ONDANSETRON 0.1 mg/kg IVP TO A MAXIMUM SINGLE DOSE OF 4 mg
IF AGE >2 years, MAY GIVE ONDANSETRON 4 mg ODT

SEPTIC SHOCK UNRESPONSIVE TO IV/IO FLUIDS AS ABOVE?
ADULT: PHARMACOLOGIC TREATMENT IF SYS BP < 100 mmHg:
NOREPINEPHRINE 2-4 mcg/kg/min TITRATE TO SYS ≥ 100 mmHg **OR**
DOPAMINE 5-20 mcg/kg/min TITRATE TO SYS BP ≥ 100 mmHg IF NOREPINEPHRINE NOT AVAILABLE
PEDIATRIC: OLMC CONSULT FOR PHARMACOLOGIC TREATMENT

FEBRILE SEIZURE?
IF SOLITARY AND SHORT DURATION (< 5 MINUTES) – OBSERVE
IF PROLONGED/STATUS EPILEPTICUS, TREAT PER PROTOCOL 6D - SEIZURE

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
9B – Fever - Adult & Pediatric

1. Ferguson-Myrthil N. Vasopressor use in adult patients. Cardiol Rev. 2012 May;20(3):153-8.
2. Vasu TS, Cavallazzi R, Hirani A, Kaplan G, Leiby B, Marik PE. Norepinephrine or dopamine for septic shock: systematic review of randomized clinical trials. J Intensive Care Med. 2012 May;27(3):172-8.
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4. Suffoletto B, Frisch A, Prabhu A, Kristan J, Guyette FX, Callaway CW. Prediction of serious infection during prehospital emergency care. Prehosp Emerg Care. 2011 Jul-Sep;15(3):325-30.
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6. Robson W, Nutbeam T, Daniels R. Sepsis: a need for prehospital intervention? Emerg Med J. 2009 Jul;26(7):535-8.

9C – EPISTAXIS ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Epistaxis control
2. Vital signs

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

NOSEBLEED CONTROL
PINCH ENTIRE SOFT PART OF NOSE RIGHT UNDER NASAL BONE
HOLD FIRMLY UNTIL HELP ARRIVES
HAVE PATIENT SIT FORWARD AND KEEP STILL
DO NOT SNIFF OR BLOW

EMR / EMT

GENERAL SUPPORTIVE CARE (MEDICAL PT) OR TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE (TRAUMA PT)
HISTORY TO INCLUDE IF PT TAKING ANTIPLATELET AGENT (eg. ASPIRIN) OR ANTICOAGULANT (eg. WARFARIN)

NOSEBLEED CONTROL
POSITION PATIENT SO BLOOD IS NOT SWALLOWED OR ASPIRATED
PINCH ENTIRE SOFT PART OF NOSE RIGHT UNDER NASAL BONE – MAY APPLY NOSE CLAMP TO ASSIST WITH PROLONGED APPLICATION OF DIRECT PRESSURE
IF STILL BLEEDING, HAVE PATIENT BLOW THEIR NOSE TO CLEAR BLOOD CLOTS FROM NASAL PASSAGE
HEMOSTATIC DRESSING IN ANTERIOR NOSTRIL(S) IF INDICATED

OBTAIN VITAL SIGNS

EMT OR HIGHER LICENSE:
ADULT & PEDIATRIC OLDER THAN 12 YEARS OF AGE: PHENYLEPHRINE SPRAY 2 SPRAYS IN AFFECTED NOSTRIL(S)
COMPRESS NOSE IMMEDIATELY AFTER ADMINISTRATION OF PHENYLEPHRINE SPRAY

EMT-I85 / AEMT

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg
REPEAT UP TO 60 mL/kg IF SYS BP REMAINS < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
9C – Epistaxis – Adult& Pediatric

1. Smith J, Siddiq S, Dyer C, Rainsbury J, Kim D.Epistaxis in patients taking oral anticoagulant and antiplatelet medication: prospective cohort study.J Laryngol Otol. 2011 Jan;125(1):38-42.
2. Rainsbury JW, Molony NC.Clopidogrel versus low-dose aspirin as risk factors for epistaxis.ClinOtolaryngol. 2009 Jun;34(3):232-5.
3. Pallin DJ, Chng YM, McKay MP, Emond JA, Pelletier AJ, Camargo CA Jr.Epidemiology of epistaxis in US emergency departments, 1992 to 2001.Ann Emerg Med. 2005 Jul;46(1):77-81.
4. Leong SC, Roe RJ, Karkanevatos A.No frills management of epistaxis.Emerg Med J. 2005 Jul;22(7):470-2.
5. Middleton PM.Epistaxis.Emerg Med Australas. 2004 Oct-Dec;16(5-6):428-40.

9D – PAIN MANAGEMENT (ACUTE ONSET & CHRONIC TYPE) ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Vital signs
2. Opiate analgesia as clinically appropriate per protocol

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
DO NOT MOVE THE PATIENT UNLESS IN DANGER
DO NOT ATTEMPT TO SPLINT INJURIES

EMR / EMT

GENERAL SUPPORTIVE CARE (MEDICAL PT) OR TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE (TRAUMA PT)
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR (when available)

EMT OR HIGHER LICENSE:
MEASURE END – TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, ** Mandatory use if pt intubated)

EMT-I85 / AEMT

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg
REPEAT UP TO 60 mL/kg IF SYS BP REMAINS < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ANALGESIA (IF REQUIRED – PARAMEDIC DISCRETION, PARTICULARLY WITH CHRONIC PAIN SYMPTOMS)

FOR OPIATE USE, ADULT MUST HAVE SYS BP ≥ 100 mmHg; PEDIATRIC MUST HAVE SYS BP ≥ (70 + 2x age in years) mmHg

ADULT: FENTANYL 1 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 100 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 3 mcg/kg or 250 mcg WHICHEVER IS LESSER.
OR
ADULT: MORPHINE SULFATE 2 - 4 mg SLOW IVP, MAY REPEAT 2 - 4 mg EVERY 5 MINUTES TO A TOTAL OF 10 mg.
OR
ADULT: HYDROMORPHONE 0.5 - 1 mg SLOW IVP, MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 2 mg.

PEDIATRIC: OLMCP ORDER ONLY

OLMCP CONSULT IF FURTHER ANALGESIA REQUIRED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
9D – Pain Management (Acute Onset & Chronic Type) – Adult& Pediatric

1. Bendall JC, Simpson PM, Middleton PM. Effectiveness of prehospital morphine, fentanyl, and methoxyflurane in pediatric patients. PrehospEmerg Care. 2011 Apr-Jun;15(2):158-65.
2. Park CL, Roberts DE, Aldington DJ, Moore RA. Prehospital analgesia: systematic review of evidence. J R Army Med Corps. 2010 Dec;156(4 Suppl 1):295-300.
3. Middleton PM, Simpson PM, Sinclair G, Dobbins TA, Math B, Bendall JC. Effectiveness of morphine, fentanyl, and methoxyflurane in the prehospital setting. PrehospEmerg Care. 2010 Oct-Dec;14(4):439-47.
4. Yuan Y, Chen JY, Guo H, Zhang Y, Liang DM, Zhou D, Zhao H, Lin F.Relief of abdominal pain by morphine without altering physical signs in acute appendicitis.Chin Med J (Engl). 2010 Jan 20;123(2):142-5.
5. Sharwood LN, Babl FE.The efficacy and effect of opioid analgesia in undifferentiated abdominal pain in children: a review of four studies.PaediatrAnaesth. 2009 May;19(5):445-51.
6. Thomas SH, Shewakramani S. Prehospital trauma analgesia. J Emerg Med. 2008 Jul;35(1):47-57.
7. Bailey B, Bergeron S, Gravel J, Bussières JF, BensoussanA.Efficacy and impact of intravenous morphine before surgical consultation in children with right lower quadrant pain suggestive of appendicitis: a randomized controlled trial.Ann Emerg Med. 2007 Oct;50(4):371-8.
8. Rickard C, O'Meara P, McGrail M, Garner D, McLean A, Le Lievre P. A randomized controlled trial of intranasal fentanyl vs intravenous morphine for analgesia in the prehospital setting. Am J Emerg Med. 2007 Oct;25(8):911-7.
9. Gallagher EJ, Esses D, Lee C, Lahn M, Bijur PE.Randomized clinical trial of morphine in acute abdominal pain.Ann Emerg Med. 2006 Aug;48(2):150-60, 160.e1-4.
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11. Pointer JE, Harlan K.Impact of liberalization of protocols for the use of morphine sulfate in an urban emergency medical services system.PrehospEmerg Care. 2005 Oct-Dec;9(4):377-81.
12. Thomas SH, Rago O, Harrison T, Biddinger PD, Wedel SK. Fentanyl trauma analgesia use in air medical scene transports. J Emerg Med. 2005 Aug;29(2):179-87.
13. McManus JG Jr, Sallee DR Jr. Pain management in the prehospital environment. Emerg Med Clin North Am. 2005 May;23(2):415-31.
14. DeVellis P, Thomas SH, Wedel SK, Stein JP, Vinci RJ. Prehospital fentanyl analgesia in air-transported pediatric trauma patients. PediatrEmerg Care. 1998 Oct;14(5):321-3.

9E – DIALYSIS-RELATED ISSUES ADULT & PEDIATRIC

TREATMENT PRIORITIES:

1. Circulatory support
   - External bleeding control
   - Hypotension treatment with fluids and/or vasopressors
   - Calcium chloride & Bicarb for hyperkalemia
   - Vascular access precaution: avoid fistulas/graft/shunt
2. Hypoglycemia care

EMD

CPR BY EMD INSTRUCTION (if applicable)
CONTROL ANY BLEEDING
WITH DIRECT PRESSURE
ADVISE REST

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMR | EMT

GENERAL SUPPORTIVE CARE
OBTAIN VS

DIALYSIS PORT/CATHETER/FISTULA BLEEDING?
DIRECT PRESSURE
HEMOSTATIC AGENT
TOURNIQUET PROXIMAL TO FISTULA IF BLEEDING SEVERE & UNCONTROLLABLE ON EXTREMITY

ADULT & PEDIATRIC WEIGHT ≥25 kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dl, 1tube ORAL GLUCOSE (15g) PO
PEDIATRIC WEIGHT <25 kg HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dl, ½ tube ORAL GLUCOSE (7.5g) PO

EMT - I85 | AEMT

VASCULAR ACCESS?
IN MANY SITUATIONS, DIALYSIS PROFESSIONALS WILL LEAVE CATHETER IN PLACE TO USE AS IV PRN
DO NOT INITIATE IV USING EMS CATHETERS IN FISTULA/GRAFT/SHUNT – VASCULAR DAMAGE CAN OCCUR
USE IO ACCESS IF IV ACCESS UNOBTAINABLE

SYMPTOMATIC HYPOTENSION?
ADULT & PEDIATRIC: 10 mL/kg (MAX OF 500 mL IF ANURIC) NS IV/IO BOLUS IF NO SIGNS OF PULMONARY EDEMA

HYPOGLYCEMIA?
ADULT & PEDIATRIC WEIGHT ≥25 kg: IF GLUCOSE <50 mg/dl, D50 1 mL/kg IVP/IOP UP TO 50 mL

PARAMEDIC

CARDIAC ARREST OR VENTRICULAR DYSRHYTHMIA FROM KNOWN/SUSPECTED HYPERKALEMIA?
ADULT/PEDIATRIC: CALCIUM CHLORIDE 10 mg/kg IVP/IOP (MAX 1 gram) & SODIUM BICARBONATE 1 mEq/kg IVP/IOP (MAX 50 mEq)

CARDIAC ARREST FROM PRE-EXISTING METABOLIC ACIDOSIS?
ADULT/PEDIATRIC: SODIUM BICARBONATE 1 mEq/kg IVP/IOP (MAX 50 mEq)

SYMPTOMATIC HYPOTENSION WITHOUT IMPROVEMENT AFTER 10 mL/kg IVF (MAX 500 mL IF ANURIC)?
ADULT: PHARMACOLOGIC TREATMENT IF SYS BP < 100 mmHg:
DOPAMINE 5-20 mcg/kg/min TITRATE TO SYS BP ≥ 100 mmHg **OR**
NOREPINEPHRINE 2-4 mcg/kg/min TITRATE to SYS ≥ 100 mmHg
PEDIATRIC: OLMC CONSULT FOR PHARMACOLOGIC TREATMENT

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT PER DESTINATION PROTOCOL

Medical Literature References
9E – Dialysis-Related Issues - Adult & Pediatric

1. Protocol expert consultant: Sunil Agrawal, MD. Nephrology Specialists of Oklahoma, Tulsa. Board certified in nephrology and internal medicine by the American Board of Internal Medicine.
2. Davis TR, Young BA, Eisenberg MS, Rea TD, Copass MK, Cobb LA. Outcome of cardiac arrests attended by emergency medical services staff at community outpatient dialysis centers. Kidney Int. 2008 Apr;73(8):933-9.
3. Venkat A, Kaufmann KR, Venkat K. Care of the end-stage renal disease patient on dialysis in the ED. Am J Emerg Med. 2006 Nov;24(7):847-58.
4. Lafrance JP, Nolin L, Senécal L, Leblanc M. Predictors and outcome of cardiopulmonary resuscitation (CPR) calls in a large haemodialysis unit over a seven-year period. Nephrol Dial Transplant. 2006 Apr;21(4):1006-12.
5. Wald DA. ECG manifestations of selected metabolic and endocrine disorders. Emerg Med Clin North Am. 2006 Feb;24(1):145-57, vii.
6. Loran MJ, McErlean M, Eisele G, Raccio-Robak N, Verdile VP. The emergency department care of hemodialysis patients. ClinNephrol. 2002 Jun;57(6):439-43.

9F – INFECTIOUS DISEASE PRECAUTION RECOMMENDATIONS EMS PROFESSIONALS

EMERGENCY MEDICAL RESPONDER

EMT

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

In the course of EMS care of a patient (from time of emergency services request through transport of the patient to the destination location), EMS professionals should be informed, aware, and proactive regarding practices that reduce their exposure to infectious diseases, with a goal of preventing transmission of those infectious diseases to and/or through EMS professionals.

The following recommendations are general guidelines that will assist in reducing exposure to infectious diseases in the commission of EMS treatment of patients.

1. Follow immunization recommendations from Centers for Disease Control Advisory Committee on Immunization Practices (ACIP) (eg. Hepatitis B and Flu vaccinations)
2. Always be prepared for isolation from body substances (blood, respiratory secretions, sputum, saliva, emesis, fecal matter).
3. Wear examination gloves (in most situations, non-sterile type) during patient care activities.
4. If patient conditions tolerate, reduce exposure of suspected infectious respiratory droplets by covering the patient's nose and mouth in oxygen administration (eg. non-rebreather mask) or with a facemask (eg. surgical type facemask) if oxygen administration is not required.
5. When providing airway assessment and management, maximize the functional distance between the patient's nose and mouth and the EMS professional's nose and mouth. The greater the possible distance, the lesser the risk of respiratory illness transmission.
6. Wear appropriate body substance isolation (eyesplash protection, mask over nose/mouth, gloves as previously noted, gown to protect personal uniform contamination) as patient suspected illness/injury may dictate.
7. During treatment of the patient, avoid likely trajectories of bleeding, coughing, spitting, vomiting, defecating whenever possible.
8. Exercise extremely diligent action when handling or around the handling of contaminated sharps (eg. IV/IO needles, needle/syringe, glucometry lancets) and have appropriate sharps container readily present at patient side and on ambulance.
9. For all exposures, wash exposed area(s) as soon as possible with copious irrigation and/or antibacterial solution approved for that area(s) use.
10. In the event of exposure, follow general principles as listed in Protocol 9G – Post-Exposure Prophylaxis Recommendations as well as agency-specific policies. Do not delay in reporting and seeking treatment for an infectious disease/body substance exposure of concern.

Medical Literature References
9F – Infectious Disease Precaution Recommendations – EMS Professionals

1. Centers for Disease Control (CDC) resources to prevent Healthcare Associate Infections (HAIs) at http://www.cdc.gov/HAI/prevent/ppe.html accessed 7/1/12.
2. Occupational Safety Health Administration Bloodborne Pathogens Standard. 29 CFR 1910.1030 at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051 accessed 7/1/12.
3. Henderson DK. Management of needlestick injuries: a house officer who has a needlestick. JAMA. 2012 Jan 4;307(1):75-84.
4. El Sayed M, Kue R, McNeil C, Dyer KS. A descriptive analysis of occupational health exposures in an urban emergency medical services system: 2007-2009. Prehosp Emerg Care. 2011 Oct-Dec;15(4):506-10.
5. CDC. Immunization of Health-Care Personnel: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR,* 2011; 60(RR-7).
6. Chin RL. Postexposure prophylaxis for HIV. Emerg Med Clin North Am. 2010 May;28(2):421-9.
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8. Merchant RC, Nettleton JE, Mayer KH, Becker BM. Blood or body fluid exposures and HIV postexposure prophylaxis utilization among first responders. Prehosp Emerg Care. 2009 Jan-Mar;13(1):6-13.
9. Chapman LE, Sullivent EE, Grohskopf LA, Beltrami EM, Perz JF, Kretsinger K, Panlilio AL, Thompson ND, Ehrenberg RL, Gensheimer KF, Duchin JS, Kilmarx PH, Hunt RC. Postexposure interventions to prevent infection with HBV, HCV, or HIV, and tetanus in people wounded during bombings and other mass casualty events--United States, 2008: recommendations of the Centers for Disease Control and Prevention and Disaster Medicine and Public Health Preparedness. Disaster Med Public Health Prep. 2008 Oct;2(3):150-65.
10. Panlilio AL, Cardo DM, Grohskopf LA, Heneine W, Ross CS; U.S. Public Health Service. Updated U.S. Public Health Service guidelines for the management of occupational exposures to HIV and recommendations for postexposure prophylaxis. MMWR Recomm Rep. 2005 Sep 30;54(RR-9):1-17.
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12. Datta SD, Armstrong GL, Roome AJ, Alter MJ. Blood exposures and hepatitis C virus infections among emergency responders. Arch Intern Med. 2003 Nov 24;163(21):2605-10.
13. Rinnert KJ, O'Connor RE, Delbridge T. Risk reduction for exposure to blood-borne pathogens in EMS. National Association of Emergency Medical Services Physicians. Prehosp Emerg Care. 1998 Jan-Mar;2(1):62-6.

9G – POST-EXPOSURE PROPHYLAXIS RECOMMENDATIONS ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Preventing an exposure is always better than the "cure" for an exposure. Despite careful practices, EMS professionals can experience at least one concerning infectious disease exposure in a career.

Every EMS organization should have a pre-planned course of rapid, clinically-effective action steps (regardless of time of day, day of week) to be followed in the event of EMS professionals sustaining concerning occupational exposures to infectious diseases. The Medical Director should be involved in the planning of post-exposure evaluation and post-exposure prophylaxis (PEP) care.

The following recommendations are general guidelines that can assist in post-exposure evaluation and PEP care:

1. Wash exposed area(s) as soon as possible with copious irrigation and/or antibacterial solution approved for that area(s) use.
2. Gather as much information about the exposure of concern as possible – what body substance (eg. blood, saliva), what route of exposure, timing/amount of exposure, patient demographics, location of the exposure source (e.g. in the emergency department at "any town" hospital), and any related infectious disease medical history of the patient (eg. known HIV or Hepatitis C?).
3. Do not delay in reporting and seeking treatment for an infectious disease/body substance exposure of concern. Regardless of time of day or day or week, seek direction from the appropriate EMS supervisor and/or report to the employer's pre-designated PEP health care facility immediately after the patient's care can be transferred to other healthcare providers. Time to treatment (in hours) is of the essence to reduce transmission of infectious disease.
4. A national resource exists for real-time PEP care. This clinical resource is maintained at the University of California at San Francisco/San Francisco General Hospital. **Treating physicians can access phone advice (PEP line) at 1-888-448-4911 in the evaluation and treatment for occupational events concerning for exposure to HIV, hepatitis, and other blood-borne pathogens. The PEP line is answered from 0800-0100 Central Standard Time except on holidays. Messages left during unanswered hours are returned during the next operational morning.**

PROTOCOL 9G: Post-Exposure Prophylaxis Recommendations – Adult & Pediatric, cont

5. Additional information on PEP care can be obtained at the following website: http://www.nccc.ucsf.edu/hiv_clinical_resources/pepline_guidances_for_occupational_exposures/
6. The Oklahoma State Department of Health has a policy and reporting form for EMS professional use in the event of an occupational exposure to infectious disease of concern. The information and form can be accessed at the following website: http://www.ok.gov/health/Disease,_Prevention,_Preparedness/HIV_STD_Service/Communicable_Disease_Report_Form/index.html. A copy of this form (OSDH Form 207) can be found in Section 19 of these protocols.

Medical Literature References
9G – Post-Exposure Prophylaxis Recommendations – Adult & Pediatric

1. National HIV/AIDS Clinicians' Consultation Center at http://www.nccc.ucsf.edu/home/ accessed 7/1/12.
2. Oklahoma State Department of Health (OSDH) OAC 310:555 at http://www.ok.gov/health/documents/HIV-Statute%20555-504.pdf accessed 7/1/12.
3. OSDH Form 207 at http://www.ok.gov/health/documents/HIV-Communicable%20Disease%20Risk%20Exposure%20Report.pdf accessed 7/1/12.
4. Centers for Disease Control (CDC) resources to prevent Healthcare Associate Infections (HAIs) at http://www.cdc.gov/HAI/prevent/ppe.html accessed 7/1/12.
5. Occupational Safety Health Administration Bloodborne Pathogens Standard. 29 CFR 1910.1030 at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051 accessed 7/1/12.
6. Henderson DK. Management of needlestick injuries: a house officer who has a needlestick. JAMA. 2012 Jan 4;307(1):75-84.
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8. CDC. Immunization of Health-Care Personnel: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR,* 2011; 60(RR-7).
9. Chin RL. Postexposure prophylaxis for HIV. Emerg Med Clin North Am. 2010 May;28(2):421-9.
10. Boal WL, Leiss JK, Ratcliffe JM, Sousa S, Lyden JT, Li J, Jagger J. The national study to prevent blood exposure in paramedics: rates of exposure to blood. Int Arch Occup Environ Health. 2010 Feb;83(2):191-9.
11. Merchant RC, Nettleton JE, Mayer KH, Becker BM. Blood or body fluid exposures and HIV postexposure prophylaxis utilization among first responders. Prehosp Emerg Care. 2009 Jan-Mar;13(1):6-13.
12. Chapman LE, Sullivent EE, Grohskopf LA, Beltrami EM, Perz JF, Kretsinger K, Panlilio AL, Thompson ND, Ehrenberg RL, Gensheimer KF, Duchin JS, Kilmarx PH, Hunt RC. Postexposure interventions to prevent infection with HBV, HCV, or HIV, and tetanus in people wounded during bombings and other mass casualty events--United States, 2008: recommendations of the Centers for Disease Control and Prevention and Disaster Medicine and Public Health Preparedness. Disaster Med Public Health Prep. 2008 Oct;2(3):150-65.
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14. Miller NL, Gudmestad T, Eisenberg MS. Development of model infectious disease protocols for fire and EMS personnel. Prehosp Emerg Care. 2005 Jul-Sep;9(3):326-32.
15. Datta SD, Armstrong GL, Roome AJ, Alter MJ. Blood exposures and hepatitis C virus infections among emergency responders. Arch Intern Med. 2003 Nov 24;163(21):2605-10.
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9H - VASCULAR ACCESS - INTRAVENOUS ADULT & PEDIATRIC

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

Indications:

1. Vascular access for intravenous administration of crystalloid fluids in hypotension and/or volume insufficiency.
2. Vascular access for intravenous administration of medications for a multitude of medically indicated effects.
3. Vascular access in a patient with an increased potential for needing either of the above indications.

Contraindications:

1. None absolute, though despite aseptic technique and using sterile angiocatheters, there is always a risk of introducing infection when the skin integrity is violated. Do not establish IV access unless directed by applicable treatment protocol(s) or the patient meets one of the indications above.
2. Venous sites distal to a fracture.
3. Venous site underlying cellulitis/abscess.

Technique:

A. Extremity:

1. Apply IV tourniquet proximal to proposed vascular access site.
2. Clean insertion site with ChloraPrep®, Betadine®, or alcohol prep.
3. Stabilize vein in place by applying gentle traction on vein distal to point of entry.
4. Puncture the skin with the bevel of the needle upward about 0.5 - 1 cm from the vein and enter the vein from the side or from above.
5. Note blood return and advance the catheter over the needle.
6. Remove needle and connect IV line. Note: venous blood for laboratory work may be drawn with syringe before connecting IV line.
7. Release IV tourniquet.
8. Open IV tubing clamp full to check flow and placement, then slow rate to TKO or as indicated by applicable treatment protocol.
9. Secure catheter and tubing with tape or commercial device in a manner that reduces traction upon the catheter.
10. Anchor with an arm board or splint if the catheter is likely to be dislodged.
11. Recheck IV patency periodically to minimize occurrence of unrecognized fluid/medication extravasation.

PROTOCOL 9H: Vascular Access - Intravenous – Adult & Pediatric, cont.

Technique:

B. External Jugular Vein – for peripheral venous access in a patient in extremis only.
Anatomical landmarks, including the vein, must be visible – no "blind" sticks.
Avoid multiple attempts and avoid attempts on both sides – use IO access prn.

1. Position the patient supine, head down (this may not be necessary or desirable if congestive heart failure or respiratory distress present). Turn patient's head to opposite side from procedure. (Maintain cervical spine alignment if cervical spinal injury suspected; do not attempt external jugular vein cannulation in suspected cervical spine injury patients.)
2. Expose vein by having patient bear down if possible, and "tourniquet" vein with finger pressure just above clavicle.
3. Clean insertion site with ChloraPrep®, Betadine®, or alcohol prep.
4. Stabilize vein in place by applying gentle traction on vein distal to point of entry.
5. Align the cannula in the direction of the vein, with the point aimed toward the shoulder on the same side.
9. Puncture skin over vein first, then puncture vein itself. Use other hand to traction vein near clavicle to prevent rolling.
10. Proceed as with extremity vein. Do not wrap any tape/retaining device around the circumference of neck to stabilize IV catheter/line.

Complications:

1. Local: hematoma formation, infection, thrombosis, phlebitis.
2. Systemic: bacteremia/sepsis, catheter fragment embolus.

Additional Notes:

A. Antecubital veins are useful access sites for patients in shock, but if possible, avoid areas near joints (or splint well!).
B. The point between the junction of two veins is more stable and often easier to use.
C. Start distally and, if successive attempts are necessary, make more proximal attempts.
D. The most difficult problem with IV insertion is to know when to try and when to stop trying. If the procedure is not accomplished after two attempts or two minutes, the EMT – I85 or higher licensed EMS professional must consider expediting other care, including transport to the emergency department, with further attempts enroute. This does not pertain to the trauma patient where rapid transport is advised with IV's performed enroute to the hospital.
E. Renal dialysis fistulas and surgically implanted ports should not be used for vascular access. Use IO access in critical patient situations otherwise.
F. Saline locks may be utilized in place of crystalloid infusions/IV lines in conditions less likely to require rapid administration of IV fluid.

Medical Literature References
9H - Vascular Access – Intravenous - Adult & Pediatric

1. Merlin MA, Kaplan E, Schlogl J, Suss H, DosSantos FD, Ohman-Strickland P, Shiroff A. Study of placing a second intravenous line in trauma. PrehospEmerg Care. 2011 Apr-Jun;15(2):208-13.
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3. Carr BG, Brachet T, David G, Duseja R, Branas CC. The time cost of prehospital intubation and intravenous access in trauma patients. Prehosp Emerg Care. 2008 Jul-Sep;12(3):327-32.]
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5. Boyle MF, Kuntz B. Saline locks in prehospital care. Prehosp Disaster Med. 1994 Jul-Sep;9(3):190-2.
6. Slovis CM, Herr EW, Londorf D, Little TD, Alexander BR, Guthmann RJ. Success rates for initiation of intravenous therapy en route by prehospital care providers. Am J Emerg Med. 1990 Jul;8(4):305-7.

9I - VASCULAR ACCESS - INTRAOSSEOUS ADULT & PEDIATRIC

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

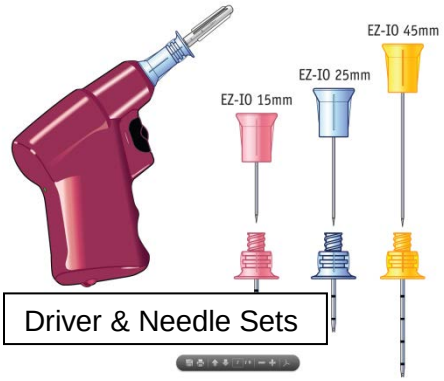
Indications:

1. First-choice access in cardio/pulmonary arrest (unless IV access can be achieved as timely).
2. Second-choice access in dynamic, life-threatening shock or respiratory failure (if IV access cannot be achieved in clinically needed time).

Contraindications:

1. Inability to locate anatomical landmarks (blind insertion contraindicated).
2. Suspected cellulitis at insertion site.
3. Suspected acute or non-healed fracture proximal to foot in same leg (proximal tibial insertion) or proximal to forearm in same arm (humeral head insertion).
4. Suspected total knee arthroplasty/replacement (proximal tibial insertion).
5. Suspected markedly poor circulation extremity (history of amputation, gangrene, bypass).

Technique (Vidacare® EZ-IO® System – see protocol Special Note):



Driver & Needle Sets

A. Assemble following materials:
   1. Driver with Needle Set based on patient size and weight:
      15mm 3-39 kg (PINK);
      25mm 40kg and greater (BLUE);
      45mm 40kg and greater (excessive tissue) (YELLOW).
   2. EZ-Connect® 90 degree connection set.
   3. Alcohol wipe (or ChloraPrep® or equivalent if available).
   4. Saline flush syringe.
   5. 1 mg/kg Lidocaine (up to 40mg) for intraosseous push if patient responsive.
   6. Pressure infuser.
   7. EZ-IO®Stabilizer (optional if proximal tibia insertion; required if humeral head insertion).

B. Locate insertion site:
   1. Proximal tibia site (Figure 1). This is the preferred site unless contraindicated as detailed above.
   2 Palpate patella (1). Palpate tibial tuberosity (2) approximately two fingers widths below patella in adults and adolescents, or one finger width below patella in smaller pediatrics. Insertion (3) at one finger width medial to tibial tuberosity in the tibial plateau.

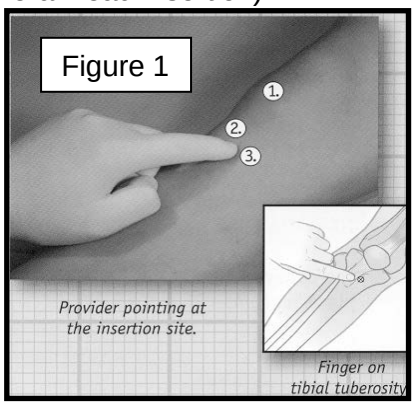


Figure 1

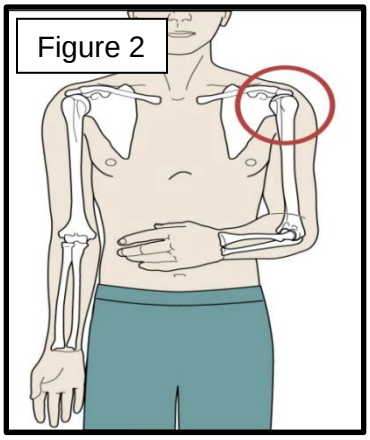
PROTOCOL 9I: Vascular Access - Intraosseous, Adult & Pediatric, cont.

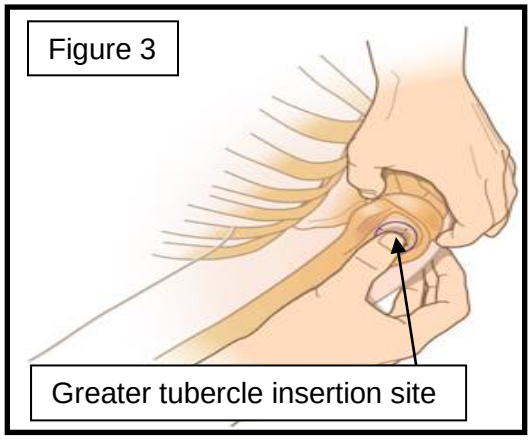
B. Locate insertion site (cont.)

2. Humeral head site. Extra precision should be taken when utilizing this site. The anatomy proves more difficult to locate, the insertion area is smaller, and the IO needle is more prone to dislodgement due to a thinner bony cortex and higher likelihood of inadvertent EMS provider contact with the IO line.

   Position arm in 90 degree flexion, with elbow kept to side of trunk (Figure 2). This position helps to gain maximal "exposure" of the humeral head.

   Palpate and identify the mid-shaft humerus and continue palpating with a thumb proximal toward the humeral head. Near the shoulder, note a small protrusion. This is the base of the greater tubercle insertion site. With the opposite hand "pinching" the anterior and inferior aspects of the humeral head, confirm the identification of the greater tubercle in the midline of the humerus. (Figure 3).





C. Clean insertion site with alcohol wipe, or preferably with ChloraPrep® or equivalent swab.

D. Access the intraosseous space.

1. Stabilize anatomy near the insertion site with non-dominant hand.
2. Position driver at insertion site with needle at 90 degree angle to the surface of the bone. Use driver to insert needle through the skin at the insertion site until you feel the needle tip encounter bone. Allow the driver to perform its function of progressively inserting the needle. Avoid strong, downward pressure on the needle and maintain constant driver drilling speed. (Figure 4 next page – proximal tibia insertion site depicted)
3. Once the bone cortex feels encountered, ensure use of proper sized needle by checking for visualization of at least one 5 mm mark line (solid black circumferential line on the needle). If at least one 5mm mark line is not visible, a longer needle will be required to achieve useable intraosseous access. (Figure 5 next page)

PROTOCOL 9I: Vascular Access - Intraosseous, Adult & Pediatric, cont.

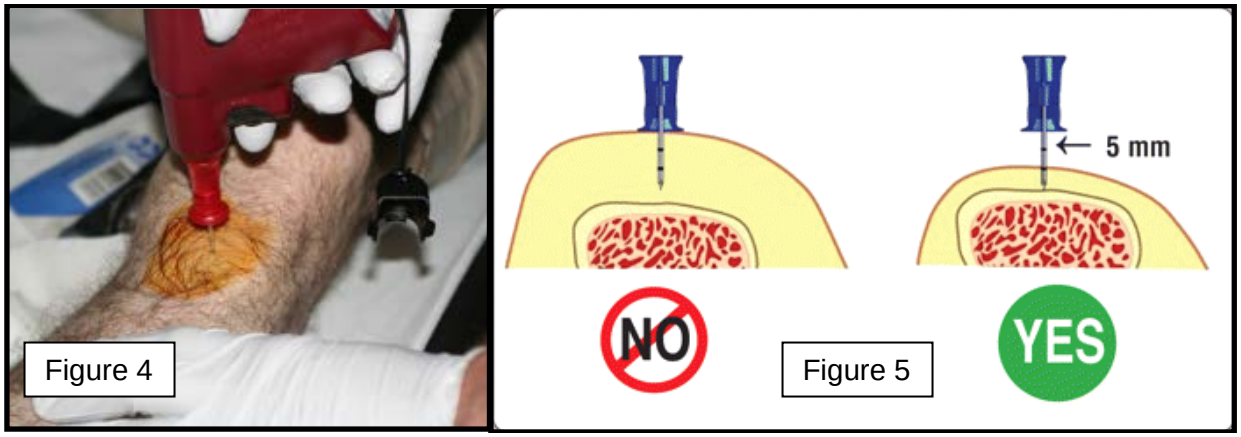


Figure 4 Figure 5

4. Resume use of driver to insert a properly-sized needle through the bony cortex and into the bony marrow (evident with a sudden decrease in resistance to needle insertion), maintaining the 90 degree angle to the surface of the skin. Most typically, properly-sized needles will have their hub resting on the skin surface at the time the needle tip is correctly in the marrow space.

E. While stabilizing the needle hub with a thumb and an index finger, disengage the driver from the needle in a gentle, upward motion.

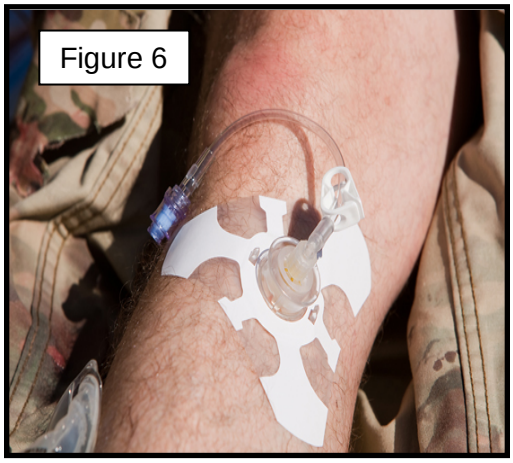
F. While still stabilizing the needle hub with a thumb and an index finger, remove the stylet by rotating it counterclockwise until disengaged.

G. Do NOT attempt aspiration of blood or marrow via the catheter. Pulling marrow into the catheter may clog the catheter and prevent its use for needed fluid and/or medication administration. Do confirm proper EZ-IO® catheter placement using a combination of the following signs:

   a. IO catheter rests at 90 degree angle and feels firmly in bone when grasping hub.
   b. Blood-tinged marrow oozes spontaneously from hub (may often be absent, yet the catheter is still correctly placed).
   c. Fluid and medication administration is possible without significant resistance and without extravasation.

H. When using the proximal tibia insertion site, use of the EZ-Stabilizer® (Figure 6 – next page) is optional and its use is determined by the EMT-Intermediate's or EMT-Paramedic's judgment. When using the humeral head insertion site, use of the EZ-Stabilizer® is required to reduce the chances of inadvertent dislodgement (refer to earlier discussion of humeral head insertion site). If the EZ-Stabilizer ® is used, it must be applied prior to connecting the 90 degree connector set to the catheter hub.

PROTOCOL 9I: Vascular Access - Intraosseous, Adult & Pediatric, cont.



I. The EZ-Connect® 90 degree connector set (also seen in Figure 6) is used to prevent excessive pressure on the catheter when infusing fluids or administering medications. Failure to use the 90 degree connector set can cause inadvertent dislodgement due to excessive pressure down the catheter. Flush the EZ-Connect® set with Normal Saline prior to attaching it to the catheter hub and then flush the line to flush the catheter with 10mL Normal Saline if patient unresponsive or Lidocaine 2% 1mg/kg up to 40mg slow intraosseous push if the patient is responsive and clearly able to sense pain. If using Lidocaine as directed, follow with 10mL Normal Saline flush.

J. Medication administration is given in the same dosing as with IV administrations.

K. Fluid administration will require the use of a pressure infuser on the IV fluid bag. Due to the increased pressure of the marrow space, IV fluid will not infuse without assistance of the pressure infuser. Inflate pressure infuser until IV fluid is seen infusing with constant flow. Monitor for extravasation and monitor for need to reinflate pressure infuser.

Complications of intraosseous line placement attempts:

Through and through bone penetration – avoid by using correct needle and insertion technique. Extravasation – avoid by using correct needle and insertion technique. Monitor ongoing use and stop at early signs of extravasation. Fracture of bone – avoid by using correct insertion technique (avoid excessive pressure). Infection – avoid by using aseptic technique and do not insert through suspected cellulitis. Growth plate injury in pediatrics – avoid by choosing correct insertion site.

Special Note:

This protocol utilizes the Vidacare® EZ-IO System® to illustrate one method of achieving intraosseous access. The Oklahoma Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the Vidacare® EZ-IO System® for intraosseous access by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in establishing and maintaining intraosseous access if not using the Vidacare® EZ-IO System®.

Medical Literature References
9I - Vascular Access – Intraosseous - Adult & Pediatric

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9J – INDWELLING CENTRAL VASCULAR DEVICE MANAGEMENT ADULT & PEDIATRIC

PARAMEDIC

Indications:

Use and/or monitoring of indwelling central venous devices.

Contraindications:

1. Central venous ports – easily permanently damaged with wrong needle or infected.
2. Suspected infection in the indwelling central venous devices
3. Easy peripheral venous access available or already established.

Technique:

Indwelling central venous devices may become irreversibly damaged if wrong needles and techniques occur. In general, avoid the use of indwelling central venous devices unless already in use (during an interfacility transfer) or in the case of a peripherally inserted central catheter (PICC) line, peripheral venous access is not readily available or already established.

In the setting of interfacility transfer, indwelling central venous device(s) must be reviewed with either the transferring practitioner/physician or appropriate nursing personnel prior to conducting the interfacility transfer. Potential complications during transfer should be discussed and contingency plans reviewed.

During packaging, patient movement, and throughout the interfacility transfer, perform periodic inspection and assessment of indwelling central venous devices and take precautions to avoid inadvertent dislodgement of such devices.

If the need arises to access a PICC line, clean the port with ChloraPrep®, Betadine®, or an alcohol wipe. Aspirate 4 - 5 mL of fluid and discard (to remove any anticoagulant in the line) prior to infusing fluid or administering medication. Flush 10 mL of saline in the PICC line after administering a medication. Maintain aseptic technique throughout all handling of the PICC line.

If a closed cap on the line is required to be removed to access the indwelling central venous device, make sure the line is clamped to avoid introduction of an air embolus.

Contact OLMC early for any needed advice or direction in the use of an indwelling central venous device.

Medical Literature References
9J – Indwelling Central Vascular Device Management – Adult & Pediatric

1. Feldman R. Chapter 39. Troubleshooting Indwelling Central Venous Lines. In: Reichman EF, Simon RR, eds. Emergency Medicine Procedures. New York: McGraw-Hill; 2004. http://www.accessemergencymedicine.com/content.aspx?aID=50037. Accessed July 1, 2012.
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9K – MEDICATION ADMINISTRATION ADULT & PEDIATRIC

Prior to all medication administrations, assure the "5 Rights" are reviewed:

1. **Right Patient**
2. **Right Route**
3. **Right Dose**
4. **Right Time**
5. **Right Medication**

If any one of these "rights" is "wrong", stop and do not administer the medication!

Specific routes of medication administration:

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

9Ka: Intravenous / Intraosseous – Adult & Pediatric:

1. Assure that the IV / IO line is patent.
2. Cleanse the access port nearest the IV / IO site with alcohol prep.
3. Eject any air from syringe and insert needle or adapter into access port.
4. Pinch the IV /IO line above the medication port. This prevents the medication from traveling toward the IV bag, forcing it instead toward the patient.
5. Inject the medication as specified per appropriate treatment protocol.
6. Remove the needle or adapter and release the tubing.
7. Open the flow regulator to allow 10 – 20 mL fluid flush.

PARAMEDIC

9Kb: Intramuscular/Subcutaneous Injection – Adult & Pediatric:

1. Use a 1 inch to 1.5 inch long 21 to 25 gauge needle on a syringe.
2. Select injection site (if IM, deltoid, lateral thigh, or upper/outer quadrant of gluteus; if SubQ, arm or lateral thigh).
3. Cleanse the injection site with alcohol prep.
4. Eject any air from syringe.
5. If IM, stretch skin over injection site and insert needle 90 degrees to skin surface, through skin into muscle, aspirate and if no blood return, inject medication.
6. If SubQ, pinch skin in a fold over injection site and insert needle 45 degrees to skin surface, through skin into subcutaneous fatty tissue, aspirate and if no blood return, inject medication.
7. Remove needle and put bandage over the injection site.

PROTOCOL 9K: Medication Administration – Adult & Pediatric, cont.

EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

9Kc: Intranasal – Adult & Pediatric, technique:

1. Use a medication nasal atomization device on a syringe.
2. Eject any air from syringe.
3. Place the atomizer tip approximately 1.5 cm within the nostril.
4. Briskly compress the syringe plunger to spray atomized solution into the nasal cavity/onto the nasal mucosa (gently pushing the plunger will not result in atomization).

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

9Kd: Sublingual/Oral – Adult & Pediatric:

1. Instruct, assist, or place the tablet or spray under the tongue (sublingual) or in the mouth (oral)/on the tongue (oral dissolving).

PARAMEDIC

9Ke: Ocular – Adult & Pediatric:

1. Don't touch the tip of the medication container to any part of the eye or face.
2. Pull the lower eyelid down while avoiding any ocular (eyeball) pressure.
3. Instill eye drop(s) in the space between the eyelid and the eyeball.

PROTOCOL 9K: Medication Administration – Adult & Pediatric, cont.

PARAMEDIC

9Kf: Intravascular Infusion Management – Adult & Pediatric:

1. Assure that the IV / IO line is patent.
2. Cleanse the access port nearest the IV / IO site with alcohol prep.
3. Flush any air from infusion line/set and insert needle or adapter into access port.
4. Unless simultaneously giving an IV fluid bolus, close off the IV line above the medication port. This prevents the medication from traveling toward the IV bag, forcing it instead toward the patient.
5. Infuse the medication as specified per appropriate treatment protocol.

Medical Literature References
9K–Medication Administration– Adult & Pediatric

1. Arthur AO, Goodloe JM, Thomas SH.Subcutaneous fluid administration: a potentially useful tool in prehospital care.Emerg Med Int. 2012;2012:904521. Epub 2012 May 9.
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PROTOCOL 9L - Nasogastric/Orogastric Tube – Adult

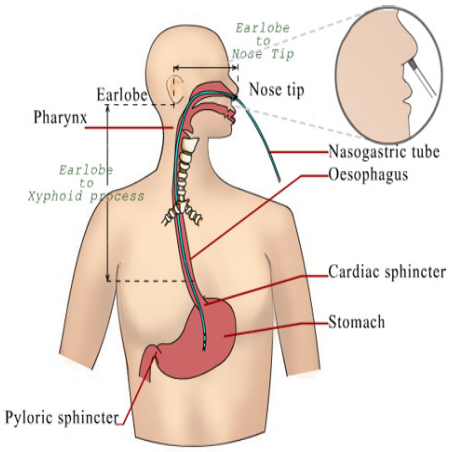
EMT-PARAMEDIC

Indications:

Decompression of ventilated air in stomach (reduction of gastric distension), compromising oxygenation/ventilation in the unconscious, intubated patient.

Contraindications:

1. Suspected basilar skull fracture
2. Suspected mid-facial fractures
3. Known or suspected actively bleeding esophageal varices



Technique:

1. Select correct size gastric tube. Adult patients typically require size 16 to 18 French gastric tubes.
2. Measure length of gastric tube to pass by starting with tip just at xiphoid process, then using distance to earlobe and over to tip of nose (Figure).
3. Mark the measured length of tube with a piece of tape.
4. Lubricate tip of tube with water soluble lubricant if inserting nasally.
5. Nasal insertion: direct gastric tube along the floor of nostril to the posterior nasopharynx, then feed the gastric tube through the oropharynx down the esophagus and into the stomach, stopping when taped mark nears nostril.
6. Oral insertion: direct gastric tube along tongue to posterior oropharynx, then feed the gastric tube down the esophagus and into the stomach, stopping when taped mark nears lips.
7. Confirm correct gastric placement of gastric tube by injecting 10 to 20 mL of air while auscultating over the stomach for a “swoosh” or “burping/bubbling” indicating the gastric tube tip lies within the stomach. Confirm absence of similar sounds in the lungs by auscultating in the mid-axillary line bilaterally while repeating the injection of small mL volumes of air.
8. Tape the tube in place on the nose or on around the mouth. Alternatively, some commercial types of endotracheal tube holders can be used to secure gastric tubes if passed orally.
9. Attach gastric tube to low pressure suction and observe for gastric decompression.

Troubleshooting:

1. Abort gastric tube passage attempts if unsuccessful in three attempts.
2. Repetitive coughing indicates the gastric tube is erroneously passing down the trachea. Tracheal/bronchial stimulation in gastric tube passage will typically provoke strong coughing reflex. Promptly withdraw tracheally placed gastric tubes to avoid aspiration. An endotracheal tube will not prevent inadvertent passage of a gastric tube down the trachea.
3. Avoid lavage or medications via gastric tube. Use is for gastric decompression.

Medical Literature References
9L - Nasogastric/Orogastric Tube – Adult

1. Leschke RR. Chapter 47. Nasogastric Intubation. In: Reichman EF, Simon RR, eds. Emergency Medicine Procedures. New York: McGraw-Hill; 2004. http://www.accessemergencymedicine.com/content.aspx?aID=50768. Accessed June 30, 2012.
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9M – SUSPECTED ABUSE/NEGLECT ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:
1. Concern for child abuse and/or neglect.
2. Concern for adult/elder abuse and/or neglect.

Contraindications:
None

In the course of EMS care of a patient (from time of emergency services request through transport of the patient to the destination location), EMS professionals that become concerned regarding actual or perceived abuse and/or neglect occurring to persons of any age should directly inform any receiving health care professionals and/or involved law enforcement officers of the concerns. If the concerns are regarding abuse and/or neglect of the patient, document such concerns in the patient care report, including specific comments that the receiving health care professional(s) and/or law enforcement officers were directly informed of such concerns in appropriate detail.

If EMS professionals believe an adult or child is being abused or neglected, and/or have concerns regarding the imminent safety of an adult or child due to possible abuse or neglect, there is a legal responsibility to report the beliefs and/or concerns.

Oklahoma Department of Human Services Abuse and Neglect Hotline (Calls Answered 24 Hours a Day/7 Days a Week)

1-800-522-3511

When calling, identify yourself by name, EMS certification level, and agency/apparatus identification. Have as much patient/person information and situational/observation information possible readily available to share with the abuse and neglect hotline specialist.

SECTION 10

TRAUMA

10A - HEAD/NECK/SPINE INJURY ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Spinal stabilization; Avoid spinal traction
2. Hemorrhage control
3. Assessment/Care for life-threatening injuries/ shock/high intracranial pressure
4. Vital signs
5. Appropriate trauma care destination selection

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

DO NOT MOVE THE PATIENT UNLESS IN DANGER
STABILIZE HEAD AND NECK IN POSITION FOUND
OPEN AIRWAY IF NOT ALERT & INEFFECTIVE BREATHING
CONTROL BLEEDING ONLY IF SERIOUS
DO NOT ATTEMPT TO SPLINT INJURIES

EMR / EMT

TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE
SPINAL "STABILIZATION" - DO NOT APPLY SPINAL "TRACTION" DURING IMMOBILIZATION
STABILIZE IMPALED OBJECTS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR (if equipped)

EMT OR HIGHER LICENSE:

MEASURE END – TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, ** Mandatory use if pt intubated)
MAINTAIN EtCO2 LEVELS, 30 – 35 mmHg
DURING SIGNS SUGGESTIVE OF INCREASING INTRACRANIAL PRESSURE
(PROGRESSIVE DECLINE IN MENTAL STATUS, POSTURING, SEIZING, DILATING/NON-REACTIVE/ASYMMETRIC PUPILS)
CONTROLLED HYPERVENTILATION

PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE.

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

IV ACCESS (IO IF INDICATED) (TWO LINES IF POSSIBLE)
ADULT: IV / IO NS 250 mL BOLUS TO MAINTAIN SYS BP $\geq$ 100mmHg
ADULT: REPEAT UP TO 2 LITERS IF SYS BP REMAINS < 100mmHg & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV / IO NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

EVALUATE FOR OTHER ALTERED MENTAL STATUS ETIOLOGIES. TREAT PER APPROPRIATE PROTOCOL(S)

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED

ADULT: MIDAZOLAM 5 mg IM/IVP/IN/IOP FOR ACTIVE SEIZURE. MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING **OR**
ADULT: DIAZEPAM 5 mg IVP/IOP or 10 mg IM FOR ACTIVE SEIZURE. MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING **OR**
ADULT: LORAZEPAM 1 mg IVP/IM/IOP FOR ACTIVE SEIZURE. MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING

PEDIATRIC: MIDAZOLAM 0.1 mg/kg IM/IVP/IN/IOP TO MAX OF 5mg FOR ACTIVE SEIZURE. MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING **OR**
PEDIATRIC: DIAZEPAM 0.1 mg/kg TO MAX OF 5mg IVP/IOP/IM FOR ACTIVE SEIZURE. MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING OR
PEDIATRIC: LORAZEPAM 0.1 mg/kg IVP/IM/IOP for ACTIVE SEIZURE. MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING

OLMC CONSULT IF SEIZURE CONTINUES DESPITE ABOVE TREATMENT

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
10A – Head/Neck/Spine Injury – Adult & Pediatric

1. Franschman G, Peerdeman SM, Andriessen TM, Greuters S, Toor AE, Vos PE, Bakker FC, Loer SA, Boer C; Amsterdam Lifeliner: Analysis of Results and Methods--Traumatic Brain Injury (ALARM-TBI) Investigators. Effect of secondary prehospital risk factors on outcome in severe traumatic brain injury in the context of fast access to trauma care. J Trauma. 2011 Oct;71(4):826-32.
2. Davis DP, Koprowicz KM, Newgard CD, Daya M, Bulger EM, Stiell I, Nichol G, Stephens S, Dreyer J, Minei J, Kerby JD. The relationship between out-of-hospital airway management and outcome among trauma patients with Glasgow Coma Scale Scores of 8 or less. PrehospEmerg Care. 2011 Apr-Jun;15(2):184-92.
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5. Haut ER, Kalish BT, Cotton BA, Efron DT, Haider AH, Stevens KA, Kieninger AN, Cornwell EE 3rd, Chang DC. Prehospital intravenous fluid administration is associated with higher mortality in trauma patients: a National Trauma Data Bank analysis. Ann Surg. 2011 Feb;253(2):371-7.
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7. Zebrack M, Dandoy C, Hansen K, Scaife E, Mann NC, Bratton SL. Early resuscitation of children with moderate-to-severe traumatic brain injury. Pediatrics. 2009 Jul;124(1):56-64.
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10B - EYE INJURY ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Vital signs
2. Eye injury specified care
3. Appropriate trauma care destination selection
4. Analgesia (if required)

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

DO NOT MOVE THE PATIENT UNLESS IN DANGER
STABILIZE HEAD AND NECK IN POSITION FOUND
OPEN AIRWAY IF NOT ALERT & INEFFECTIVE BREATHING
CONTROL BLEEDING ONLY IF SERIOUS
DO NOT ATTEMPT TO SPLINT INJURIES

EMR / EMT

TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE
OBTAIN VITAL SIGNS

BLUNT INJURY/EVISCERATION/LACERATION:
COVER INJURED EYE WITH STERILE, SALINE DAMPENED DRESSING.

PENETRATING INJURY/IMPALED OBJECT:
STABILIZE IMPALED OBJECT. COVER INJURED EYE WITH SHIELD OR OTHER DEVICE (eg. CUP) AVOIDING DIRECT CONTACT OR PRESSURE ON THE EYEBALL.

CHEMICAL INJURY:
IF EYEBALL IS INTACT, SOFT IRRIGATION WITH STERILE SALINE OR WATER

ALL EYE INJURIES:
COVER UNINJURED EYE WITH STERILE, SALINE/STERILE WATER DAMPENED DRESSING TO REDUCE STRAIN / CONSENSUAL EYE MOVEMENT

EMT-I85 / AEMT

IV ACCESS

PARAMEDIC

EVALUATE FOR OTHER ALTERED MENTAL STATUS ETIOLOGIES. TREAT PER APPROPRIATE PROTOCOL(S)

ANALGESIA (IF REQUIRED)
FOR OPIATE USE, ADULT MUST HAVE SYS BP ≥ 100 mmHg; PEDIATRIC MUST HAVE SYS BP ≥ (70 + 2x age in years) mmHg

ADULT: FENTANYL 1 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 100 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 3 mcg/kg or 250 mcg WHICHEVER IS LESSER.
OR
ADULT: MORPHINE SULFATE 2 - 4 mg SLOW IVP, MAY REPEAT 2 - 4 mg EVERY 5 MINUTES TO A TOTAL OF 10 mg.
OR
ADULT: HYDROMORPHONE 0.5 - 1 mg SLOW IVP, MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 2 mg.

PEDIATRIC: OLMCP ORDER ONLY

OLMCP CONSULT IF FURTHER ANALGESIA REQUIRED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
10B – Eye Injury – Adult & Pediatric

1. Khare GD, Symons RC, Do DV. Common ophthalmic emergencies. Int J ClinPract. 2008 Nov;62(11):1776-84.
2. Spector J, Fernandez WG. Chemical, thermal, and biological ocular exposures. Emerg Med Clin North Am. 2008 Feb;26(1):125-36, vii.
3. Bord SP, Linden J. Trauma to the globe and orbit. Emerg Med Clin North Am. 2008 Feb;26(1):97-123, vi-vii.
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Oklahoma State Department of Health

Emergency Medicine University of Oklahoma

EMS DIVISION

10C - DENTAL INJURY/PAIN ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Vital signs
2. Dental injury specified care
3. Appropriate trauma care destination selection
4. Analgesia (if required)

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

DO NOT MOVE THE PATIENT UNLESS IN DANGER
STABILIZE HEAD AND NECK IN POSITION FOUND
OPEN AIRWAY IF NOT ALERT & INEFFECTIVE BREATHING
CONTROL BLEEDING ONLY IF SERIOUS
DO NOT ATTEMPT TO SPLINT INJURIES

EMR / EMT

TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE
OBTAIN VITAL SIGNS

BLUNT INJURY/LACERATION:
DO MOVE LOOSENED TEETH. IF ACTIVE BLEEDING, POSITION PATIENT TO AVOID ASPIRATION.

PENETRATING INJURY/IMPALED OBJECT:
STABILIZE IMPALED OBJECT. DO NOT MOVE LOOSENED TEETH. IF ACTIVE BLEEDING, POSITION PATIENT TO AVOID ASPIRATION.

TOOTH FRACTURE:
REPLACE IN SOCKET (IF ABLE WITHOUT ASPIRATION RISK)
IF UNABLE TO REPLACE IN SOCKET, PLACE IN A COMMERCIAL TOOTH CARRIER OR CONTAINER OF MILK (if available)
OTHERWISE, WRAP IN A SALINE OR STERILE WATER DAMPENED STERILE DRESSING

EMT-I85 / AEMT

IV ACCESS IF INDICATED

PARAMEDIC

ANALGESIA (IF REQUIRED)
FOR OPIATE USE, ADULT MUST HAVE SYS BP ≥ 100 mmHg; PEDIATRIC MUST HAVE SYS BP ≥ (70 + 2x age in years) mmHg

ADULT: FENTANYL 1 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 100 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 3 mcg/kg or 250 mcg WHICHEVER IS LESSER.
OR
ADULT: MORPHINE SULFATE 2 - 4 mg SLOW IVP, MAY REPEAT 2 - 4 mg EVERY 5 MINUTES TO A TOTAL OF 10 mg.
OR
ADULT: HYDROMORPHONE 0.5 - 1 mg SLOW IVP, MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 2 mg.

PEDIATRIC: OLMCP ORDER ONLY

OLMCP CONSULT IF FURTHER ANALGESIA REQUIRED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
10C – DentalInjury/Pain– Adult & Pediatric

1. Bae JH, Kim YK, Choi YH. Clinical characteristics of dental emergencies and prevalence of dental trauma at a university hospital emergency center in Korea.Dent Traumatol. 2011 Oct;27(5):374-8.
2. Stewart GB, Shields BJ, Fields S, Comstock RD, Smith GA. Consumer products and activities associated with dental injuries to children treated in United States emergency departments, 1990-2003. Dent Traumatol. 2009 Aug;25(4):399-405.
3. Dale RA. Dentoalveolar trauma. Emerg Med Clin North Am. 2000 Aug;18(3):521-38.
4. Armstrong BD. Lacerations of the mouth. Emerg Med Clin North Am. 2000 Aug;18(3):471-80, vi.

10D – CHEST/ABDOMEN/PELVIS INJURY ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES

1. Hemorrhage control
2. Assessment/Care for life-threatening injuries/shock
3. Needle thoracostomy for tension peumothorax
4. Vital signs
5. Appropriate trauma care destination selection

EMD

DO NOT MOVE THE PATIENT UNLESS IN DANGER
STABILIZE HEAD AND NECK IN POSITION FOUND
OPEN AIRWAY IF NOT ALERT & INEFFECTIVE BREATHING
CONTROL BLEEDING ONLY IF SERIOUS
DO NOT ATTEMPT TO SPLINT INJURIES

EMR / EMT

TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE
SPINAL "STABILIZATION" - DO NOT APPLY SPINAL "TRACTION" DURING IMMOBILIZATION (if applicable)
SEAL OPEN CHEST WOUNDS
STABILIZE IMPALED OBJECTS
STABILIZE SUSPECTED PELVIC FRACTURES WITH SHEET TIED LOW AROUND PELVIS (OR WITH COMMERCIAL BINDER)
COVER EVISCERATED ABDOMINAL/PELVIC ORGANS WITH STERILE, SALINE DAMPENED DRESSING PRIOR TO LAYERING WITH DRY DRESSINGS
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR (when available)

EMT OR HIGHER LICENSE:

MEASURE END – TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, ** Mandatory use if pt intubated)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE.

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

IV ACCESS (IO IF INDICATED) (TWO LINES IF POSSIBLE)
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: REPEAT UP TO 60 mL/kg IF SYS BP REMAINS < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

NEEDLE THORACOSTOMY FOR SUSPECTED TENSION PNEUMOTHORAX
ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED

ANALGESIA (IF REQUIRED)
FOR OPIATE USE, ADULT MUST HAVE SYS BP ≥ 100 mmHg; PEDIATRIC MUST HAVE SYS BP ≥ (70 + 2x age in years) mmHg

ADULT: FENTANYL 1 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 100 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 3 mcg/kg or 250 mcg WHICHEVER IS LESSER.
OR
ADULT: MORPHINE SULFATE 2 - 4 mg SLOW IVP, MAY REPEAT 2 - 4 mg EVERY 5 MINUTES TO A TOTAL OF 10 mg.
OR
ADULT: HYDROMORPHONE 0.5 - 1 mg SLOW IVP, MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 2 mg.

PEDIATRIC: OLMCP ORDER ONLY

OLMCP CONSULT IF FURTHER ANALGESIA REQUIRED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
10D – Chest/Abdomen/Pelvis Injury – Adult & Pediatric

1. Isbell CL, Batchinsky AI, Hetz KM, Baker WL, Cancio LC. Correlation between capnography and arterial carbon dioxide before, during, and after severe chest injury in swine. Shock. 2012 Jan;37(1):103-9.
2. Wigginton JG, Roppolo L, Pepe PE. Advances in resuscitative trauma care. Minerva Anestesiol. 2011 Oct;77(10):993-1002.
3. Kragh JF Jr, Murphy C, Dubick MA, Baer DG, Johnson J, Blackbourne LH. New tourniquet device concepts for battlefield hemorrhage control. US Army Med Dep J. 2011 Apr-Jun:38-48.
4. Tan EC, van Stigt SF, van Vugt AB. Effect of a new pelvic stabilizer (T-POD®) on reduction of pelvic volume and haemodynamic stability in unstable pelvic fractures. Injury. 2010 Dec;41(12):1239-43.
5. Williams-Johnson J, Williams E, Watson H. Management and treatment of pelvic and hip injuries. Emerg Med Clin North Am. 2010 Nov;28(4):841-59.
6. Nabaweesi R, Arnold MA, Chang DC, Rossberg MI, Ziegfeld S, Sawaya DE, Bathurst MA, Colombani P, Abdullah F. Prehospital predictors of risk for pelvic fractures in pediatric trauma patients. PediatrSurg Int. 2008 Sep;24(9):1053-6.
7. Yaghoubian A, Lewis RJ, Putnam B, De Virgilio C.Reanalysis of prehospital intravenous fluid administration in patients with penetrating truncal injury and field hypotension. Am Surg. 2007 Oct;73(10):1027-30.
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9. PediatrSurg Int. 2008 Sep;24(9):1053-6. The prehospital management of pelvic fractures. Emerg Med J. 2007 Feb;24(2):130-3.
10. Stockinger ZT, McSwain NE Jr. Prehospital endotracheal intubation for trauma does not improve survival over bag-valve-mask ventilation. J Trauma. 2004 Mar;56(3):531-6.
11. Shapiro NI, Kociszewski C, Harrison T, Chang Y, Wedel SK, Thomas SH. Isolated prehospital hypotension after traumatic injuries: a predictor of mortality? J Emerg Med. 2003 Aug;25(2):175-9.
12. Helm M, Schuster R, Hauke J, Lampl L. Tight control of prehospital ventilation by capnography in major trauma victims. Br J Anaesth. 2003 Mar;90(3):327-32.
13. Stafford PW, Blinman TA, Nance ML. Practical points in evaluation and resuscitation of the injured child. SurgClin North Am. 2002 Apr;82(2):273-301.
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10E – NEEDLE THORACOSTOMY – TENSION PNEUMOTHORAX DECOMPRESSION ADULT & PEDIATRIC

PARAMEDIC

Indications:

Suspected tension pneumothorax

Clinical signs of tension pneumothorax:

Increasing respiratory insufficiency in a susceptible patient:

1. Spontaneous pneumothorax
2. CPR with appearance of PEA, increased difficulty bagging patient
3. Sucking chest wound which has been covered completely and which has not responded to removal of the dressing
4. Chest trauma with suspected pneumothorax AND

Systolic blood pressure less than 100 mmHg AND
Three or more of the below:

1. "Air Hunger"
2. Cyanosis
3. Decreased breath sounds on affected side(s)
4. Jugular venous distension
5. Tracheal shift away from affected side – extremely late sign – do not wait as indication for needle thoracostomy if other signs are developing

Etiologies of tension pneumothorax include:

1. Trauma (blunt or penetrating) - disruption of either visceral or parietal pleura; often associated with rib fractures (rib fractures not necessary for tension pneumothorax to occur)
2. Barotrauma secondary to positive-pressure ventilation, especially when using high amounts of positive end-expiratory pressure (PEEP)
3. Unsuccessful attempts to convert an open pneumothorax to a simple pneumothorax in which the occlusive dressing functions as a 1-way valve
4. Chest compressions during cardiopulmonary resuscitation

Contraindications:

None absolute. Do not place a needle thoracostomy through an area of suspected cellulitis, using instead an alternative site – 5th intercostal space mid-axillary line.

PROTOCOL 10E: Needle Thoracostomy -Tension Pneumothorax Decompression - Adult & Pediatric, cont.

Precautions:

1. A SIMPLE pneumothorax causes some degree of respiratory distress and chest pain, and MAY be associated with decreased or absent breath sounds on the side of the collapse and with subcutaneous air if the cause is traumatic. TENSION pneumothorax is associated with progressive respiratory distress, dropping BP, "drum-like" hyperexpanded chest, distended neck veins, and patient deterioration. Tracheal shift may be present, but is a late sign and needle decompression should be accomplished before waiting for the appearance of tracheal shift.

2. Pneumothorax rarely presents with tension on initial assessment. Be particularly suspicious with deterioration during transport, and with patients requiring assisted ventilation.

3. In patients who are being ventilated by bag-valve mask or ventilator, caution should be exercised when performing needle decompression. If the presumptive diagnosis of a tension pneumothorax is incorrect, the insertion of the needle may create a pneumothorax, which may be converted into a tension pneumothorax by positive-pressure ventilation.

4. If a previously covered sucking chest wound is present, remove the seal and allow chest pressures to equilibrate. No further treatment is often necessary.

Technique:

A. Expose the entire chest.
B. Locate landmark on affected side(s) second intercostal space just superior to third rib, (Figure 1 illustrates the right side of the chest as the affected side).
C. Clean area of insertion with ChloraPrep®, Betadine®, or alcohol prep.
D. Attach 10 mL or larger syringe to a 15 gauge pneumothorax catheter or a 14 gauge angiocatheter. If using an angiocatheter, the length of the needle should be at least 3.25 inches to promote decompression of the pleural space. Thick chest wall musculature may prevent entry into the pleural space if using a shorter needle.
E. Decisively locate the second or third intercostal space in the mid-clavicular line.
F. Insert the needle through the skin at near or at 90 degrees and advance until tip hits the top of the rib below the intercostal space. Continue to advance angling over the top of the rib margin – advance just over the lower rib avoid the neurovascular bundle running horizontally along the lower border of the upper rib.

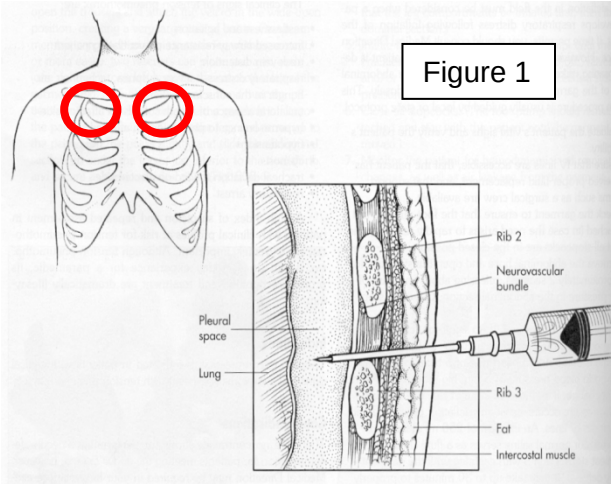

Figure 1

G. Advance needle tip into the pleural space. A slight “pop” is usually felt when the needle pierces the outside pleural membrane, or parietal pleura.

PROTOCOL 10E: Needle Thoracostomy - Tension Pneumothorax Decompression - Adult & Pediatric, cont.

Technique, cont.:

H. When tension is present, syringe plunger will typically dislodge back out of syringe, or an immediate hiss of air escaping will be heard.
I. Remove the syringe and needle and leave the catheter in the pleural space.
J. If recurrent decompensation of the patient occurs related to suspected redevelopment of tension pneumothorax, repeat the procedure next to the previously successful needle thoracostomy site.

Complications:

1. Creation of pneumothorax if none existed previously. This is an unfortunate occurrence if needle thoracostomy is done too aggressively. Do not hesitate to relieve a strongly suspected tension pneumothorax, but perform an accurate assessment to validate the suspicion of tension pneumothorax.
2. Laceration of lung, which is rare, can cause significant pulmonary injury. Avoid excessive length needles.
3. Hemothorax from vascular injury. Avoid needle thoracostomy medial to the mid-clavicular line. Avoid needle thoracostomy just inferior to a rib, where the intercostal vessels run underneath the rib margin.
4. Infection. Minimize risk by clean insertion site and maintaining aseptic technique, using sterile catheters/needles.

Note:

Studies show that needle thoracostomy in the 5th or 6th intercostal space at the mid-axillary line is effective in the release of tension pneumothorax. Consider this location if the traditional sites of the 2nd or 3rd intercostal space at the mid-clavicular line do not improve the respiratory or hemodynamic conditions of a patient with a strongly suspected tension pneumothorax, especially if using shorter angiocatheters. The chest wall musculature is thinner in this alternate location.

Medical Literature References
10E – Needle Thoracostomy (Tension Pneumonthorax Decompression) – Adult & Pediatric

1. Beckett A, Savage E, Pannell D, Acharya S, Kirkpatrick A, Tien HC. Needle decompression for tension pneumothorax in Tactical Combat Casualty Care: do catheters placed in the midaxillary line kink more often than those in the midclavicular line? J Trauma. 2011 Nov;71(5 Suppl 1):S408-12.
2. Blaivas M. Inadequate needle thoracostomy rate in the prehospital setting for presumed pneumothorax: an ultrasound study. J Ultrasound Med. 2010 Sep;29(9):1285-9.
3. Ball CG, Wyrzykowski AD, Kirkpatrick AW, Dente CJ, Nicholas JM, Salomone JP, Rozycki GS, Kortbeek JB, Feliciano DV. Thoracic needle decompression for tension pneumothorax: clinical correlation with catheter length. Can J Surg. 2010 Jun;53(3):184-8.
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5. Stevens RL, Rochester AA, Busko J, Blackwell T, Schwartz D, Argenta A, Sing RF. Needle thoracostomy for tension pneumothorax: failure predicted by chest computed tomography. PrehospEmerg Care. 2009 Jan-Mar;13(1):14-7.
6. Warner KJ, Copass MK, Bulger EM. Paramedic use of needle thoracostomy in the prehospital environment. PrehospEmerg Care. 2008 Apr-Jun;12(2):162-8.
7. Bushby N, Fitzgerald M, Cameron P, Marasco S, Bystrzycki A, Rosenfeld JV, Bailey M. Prehospital intubation and chest decompression is associated with unexpected survival in major thoracic blunt trauma. Emerg Med Australas. 2005 Oct-Dec;17(5-6):443-9.

10F – CHEST TUBE MONITORING ADULT & PEDIATRIC

PARAMEDIC

Indications:

Interfacility transfer of patient with chest tube thoracostomy.

Technique:

The chest tube thoracostomy-related device(s) must be reviewed with either the transferring practitioner/physician or appropriate nursing personnel prior to conducting the interfacility transfer. Potential complications during transfer should be discussed, such as in the possibility of recurrent pneumothorax, and contingency plans reviewed, such as releasing the occlusive dressing around the chest tube or performing a needle thoracostomy per Protocol 10E – Needle Thoracostomy. If the Paramedic feels unable to safely monitor and maintain the chest tube, he or she is to request appropriate resources from the transferring hospital to accompany the patient during transfer.

Under these conditions, EMS personnel will not begin the transfer until such request is accommodated.

During packaging, patient movement, and throughout the interfacility transfer, perform periodic inspection and assessment of the chest tube.

The chest tube may be attached to a one-way valve (Heimlich valve) that allows for air or fluid passage from the chest to the outside, often contained within a simple bag container. If a Heimlich valve is present, keep it attached to the chest tube.

The chest tube may alternatively be attached to a multi-chamber container that can be attached to low suction. This container can be used for collection of blood drainage from the chest for auto-transfusion and/or to measure how much blood or other fluid is being drained from the chest tube. The chamber connecting to the chest tube is for fluid collection. The second chamber contains a small volume of water, establishing a water seal, creating a one-way flow of air from the chest, and keeping the pressure in the chest less than atmospheric pressure. The third chamber is a suction chamber, designed to limit excessive wall suction effect on the chest. Keep the container upright to keep fluid collection measurement accurate and avoid any loss in function of the device.

Persistent bubbling in the chamber(s) indicates an air leak in the chest tube system. This may be due to a loose connection in the tube/chamber/suction circuit or due to a perforation in the airway (e.g. bronchiole). Check the visible connections of the chest tube system. If bubbling prior to transfer, discuss with transferring practitioner/physician.

Medical Literature References
10F – Chest Tube Monitoring – Adult & Pediatric

1. Joseph KT. Chapter 28. Tube Thoracostomy. In: Reichman EF, Simon RR, eds. Emergency Medicine Procedures. New York: McGraw-Hill; 2004. http://www.accessemergencymedicine.com/content.aspx?aID=48871. Accessed July 1, 2012.
2. Heimlich HJ. Heimlich valve for chest drainage. Med Instrum. 1983 Jan-Feb;17(1):29-31.

10G – EXTREMITY/AMPUTATION INJURY ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Hemorrhage control
2. Assessment/Care for life-threatening injuries/shock
3. Vital signs
4. Splint suspected fractures
5. Analgesia (if required)
6. Appropriate trauma care destination selection

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

DO NOT MOVE THE PATIENT UNLESS IN DANGER
STABILIZE HEAD AND NECK IN POSITION FOUND
OPEN AIRWAY IF NOT ALERT & INEFFECTIVE BREATHING
CONTROL BLEEDING ONLY IF SERIOUS
DO NOT ATTEMPT TO SPLINT INJURIES

EMR / EMT

TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE
SPINAL "STABILIZATION" - DO NOT APPLY SPINAL "TRACTION" DURING IMMOBILIZATION (if applicable)
APPLY TOURNIQUET FOR HEMORRHAGE UNCONTROLLED BY DIRECT PRESSURE PER PROTOCOL 10H - TOURNIQUET
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB AS APPROPRIATE
SPLINT SUSPECTED FRACTURES INCLUDING JOINT ABOVE AND BELOW AREA OF INJURY
COVER AMPUTATED ANATOMY WITH SALINE-MOISTENED GAUZE
PLACE AMPUTATED ANATOMY IN A CLEAN PLASTIC BAG
PLACE AMPUTATED ANATOMY OVER ICE, AVOIDING DIRECT CONTACT OF AMPUTATED ANATOMY WITH ICE
STABILIZE IMPALED OBJECTS
APPLY CARDIAC MONITOR (if equipped)

EMT-I85 / AEMT

IV ACCESS (IO IF INDICATED)

IV ACCESS (IO IF INDICATED) (TWO LINES IF POSSIBLE)
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: REPEAT UP TO 60 mL/kg IF SYS BP REMAINS < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ANALGESIA (IF REQUIRED)
FOR OPIATE USE, ADULT MUST HAVE SYS BP ≥ 100 mmHg; PEDIATRIC MUST HAVE SYS BP ≥ (70 + 2x age in years) mmHg

ADULT: FENTANYL 1 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 100 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 3 mcg/kg or 250 mcg WHICHEVER IS LESSER.
OR
ADULT: MORPHINE SULFATE 2 - 4 mg SLOW IVP, MAY REPEAT 2 - 4 mg EVERY 5 MINUTES TO A TOTAL OF 10 mg.
OR
ADULT: HYDROMORPHONE 0.5 - 1 mg SLOW IVP, MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 2 mg.

PEDIATRIC: OLMCP ORDER ONLY

OLMCP CONSULT IF FURTHER ANALGESIA REQUIRED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
10G – Extremity/Amputation Injury – Adult & Pediatric

1. Taylor DM, Vater GM, Parker PJ. An evaluation of two tourniquet systems for the control of prehospital lower limb hemorrhage. J Trauma. 2011 Sep;71(3):591-5.
2. Guo JY, Liu Y, Ma YL, Pi HY, Wang JR. Evaluation of emergency tourniquets for prehospital use in China. Chin J Traumatol. 2011 Jun 1;14(3):151-5.
3. Kragh JF, O Neill ML, Beebe DF, Fox CJ, Beekley AC, Cain JS, Parsons DL, Mabry RL, Blackbourne LH. Survey of the indications for use of emergency tourniquets. J Spec Oper Med. 2011 Winter;11(1):30-8.
4. Kragh JF Jr, Littrel ML, Jones JA, Walters TJ, Baer DG, Wade CE, Holcomb JB. Battle casualty survival with emergency tourniquet use to stop limb bleeding. J Emerg Med. 2011 Dec;41(6):590-7.
5. Sambasivan CN, Schreiber MA. Emerging therapies in traumatic hemorrhage control. CurrOpinCrit Care. 2009 Dec;15(6):560-8.
6. Sharp CF, Mangram AJ, Lorenzo M, Dunn EL. A major metropolitan "field amputation" team: a call to arms ... and legs. J Trauma. 2009 Dec;67(6):1158-61.
7. Kragh JF Jr, Walters TJ, Baer DG, Fox CJ, Wade CE, Salinas J, Holcomb JB. Survival with emergency tourniquet use to stop bleeding in major limb trauma. Ann Surg. 2009 Jan;249(1):1-7.
8. Mabry R, McManus JG. Prehospital advances in the management of severe penetrating trauma. Crit Care Med. 2008 Jul;36(7 Suppl):S258-66.
9. Beekley AC, Sebesta JA, Blackbourne LH, Herbert GS, Kauvar DS, Baer DG, Walters TJ, Mullenix PS, Holcomb JB; 31st Combat Support Hospital Research Group. Prehospital tourniquet use in Operation Iraqi Freedom: effect on hemorrhage control and outcomes. J Trauma. 2008 Feb;64(2 Suppl):S28-37.
10. Doyle GS, Taillac PP. Tourniquets: a review of current use with proposals for expanded prehospital use. PrehospEmerg Care. 2008 Apr-Jun;12(2):241-56.
11. Lee C, Porter KM, Hodgetts TJ. Tourniquet use in the civilian prehospital setting. Emerg Med J. 2007 Aug;24(8):584-7.
12. Dorlac WC, DeBakey ME, Holcomb JB, Fagan SP, Kwong KL, Dorlac GR, Schreiber MA, Persse DE, Moore FA, Mattox KL. Mortality from isolated civilian penetrating extremity injury. J Trauma. 2005 Jul;59(1):217-22.
13. Wood SP, Vrahas M, Wedel SK. Femur fracture immobilization with traction splints in multisystem trauma patients. PrehospEmerg Care. 2003 Apr-Jun;7(2):241-3.
14. Abarbanell NR. Prehospitalmidthigh trauma and traction splint use: recommendations for treatment protocols. Am J Emerg Med. 2001 Mar;19(2):137-40.
15. Kampen KE, Krohmer JR, Jones JS, Dougherty JM, Bonness RK. In-field extremity amputation: prevalence and protocols in emergency medical services. Prehosp Disaster Med. 1996 Jan-Mar;11(1):63-6.

10H – TOURNIQUET ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indication:Life-threatening extremity hemorrhage unable to be controlled by direct pressure or immediately obvious that direct pressure alone will not provide control.

Contraindication: None

Technique (Combat-Application-Tourniquet® - C-A-T®- see protocol special note):

The C-A-T® (Figure 1) windlass uses a free moving internal band to provide circumferential pressure to an injured and uncontrollably bleeding extremity. Once placed, keep the tourniquet secure, but uncovered so that the bleeding site can be clearly monitored as well as the tourniquet itself. The time of tourniquet application (Figure 7, e.g. TK 0145) is to be written on a piece of adhesive tape and secured to the tourniquet. Conscious patients may experience pain related to tourniquet use. In such instances, follow the pain management protocol if the patient is hemodynamically stable.

Figure 1

Step 1 (Figure 2):

The C-A-T® is applied over the extremity proximal to the bleeding site routing the self – adhering band around the extremity. Lower extremity wounds require feeding the strap through the inner slit and outer slit of the buckle. Upper extremity wounds typically require less pressure to control and do not require feeding the strap through both inner and outer slits of the buckle, though doing so is usually the optimal strategy. If a single slit is used for arm wounds, the inner slit (closest to windlass) is to be used.

Figure 2

PROTOCOL 10H: Tourniquet, Adult & Pediatric, cont.

Step 2 (Figure 3):

For all lower extremity wounds (and any upper extremity wounds desired), additionally pass the band through the outside slit of the buckle utilizing the friction adaptor buckle which will lock the band in place.

Figure 3

Step 3 (Figure 4):

Pull the self - adhering band tight and secure the band back on itself with the velcro adhesive strap.

Figure 4

Step 4 (Figure 5):

Twist the windlass until the bleeding has stopped. This will typically be at or less than 3 complete rotations of the windlass. More could be required, but be careful not to exert too much torque on the windlass to avoid breakage.

Figure 5

Step 5 (Figure 6):

Lock the rod in place with the windlass clip.

Figure 6

Step 6 (Figure 7):

Secure the rod with the strap by pulling it tight and adhering it to the opposite hook on the windlass hook. Indicate the time of tourniquet application on tape.

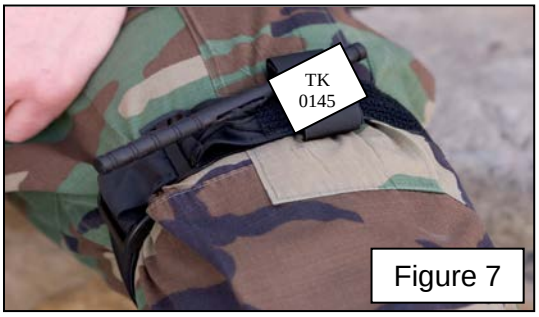


Figure 7

PROTOCOL 10H: Tourniquet, Adult & Pediatric, cont.

If one tourniquet correctly applied does not completely control hemorrhage, in addition to direct pressure, an additional tourniquet may be applied just proximal to the first tourniquet.

Once bleeding has been controlled by a tourniquet, the usual and customary practice is to leave the tourniquet in place throughout the remainder of scene care and transport to an emergency department. In infrequent circumstances, if pain control becomes an issue, the tourniquet may be loosened to see if bleeding will stay controlled. If bleeding resumes, promptly re-tighten the tourniquet to its effective tightness.

Special Note:

This protocol utilizes the Combat-Application-Tourniquet® or C-A-T® to illustrate one method of achieving extremity bleeding control using a tourniquet. The Oklahoma Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse the C-A-T® tourniquet use by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in establishing and maintaining extremity bleeding control using a tourniquet if not using the C-A-T®.

Regardless of tourniquet used, EMS professionals should use commercial tourniquets proven more effective than "homemade" devices and should use tourniquets obtained from reputable manufacturers and/or suppliers. Inferior, fake CAT tourniquets have proven to have windlass breakage under needed torque pressures.

Medical Literature References
10H – Tourniquet– Adult & Pediatric

1. Taylor DM, Vater GM, Parker PJ. An evaluation of two tourniquet systems for the control of prehospital lower limb hemorrhage. J Trauma. 2011 Sep;71(3):591-5.
2. Guo JY, Liu Y, Ma YL, Pi HY, Wang JR. Evaluation of emergency tourniquets for prehospital use in China. Chin J Traumatol. 2011 Jun 1;14(3):151-5.
3. Kragh JF, O Neill ML, Beebe DF, Fox CJ, Beekley AC, Cain JS, Parsons DL, Mabry RL, Blackbourne LH. Survey of the indications for use of emergency tourniquets. J Spec Oper Med. 2011 Winter;11(1):30-8.
4. Kragh JF Jr, Littrel ML, Jones JA, Walters TJ, Baer DG, Wade CE, Holcomb JB. Battle casualty survival with emergency tourniquet use to stop limb bleeding. J Emerg Med. 2011 Dec;41(6):590-7.
5. Sambasivan CN, Schreiber MA. Emerging therapies in traumatic hemorrhage control. Curr Opin Crit Care. 2009 Dec;15(6):560-8.
6. Kragh JF Jr, Walters TJ, Baer DG, Fox CJ, Wade CE, Salinas J, Holcomb JB. Survival with emergency tourniquet use to stop bleeding in major limb trauma. Ann Surg. 2009 Jan;249(1):1-7.
7. Mabry R, McManus JG. Prehospital advances in the management of severe penetrating trauma. Crit Care Med. 2008 Jul;36(7 Suppl):S258-66.
8. Beekley AC, Sebesta JA, Blackbourne LH, Herbert GS, Kauvar DS, Baer DG, Walters TJ, Mullenix PS, Holcomb JB; 31st Combat Support Hospital Research Group. Prehospital tourniquet use in Operation Iraqi Freedom: effect on hemorrhage control and outcomes. J Trauma. 2008 Feb;64(2 Suppl):S28-37.
9. Doyle GS, Taillac PP. Tourniquets: a review of current use with proposals for expanded prehospital use. Prehosp Emerg Care. 2008 Apr-Jun;12(2):241-56.
10. Lee C, Porter KM, Hodgetts TJ. Tourniquet use in the civilian prehospital setting. Emerg Med J. 2007 Aug;24(8):584-7.
11. Dorlac WC, DeBakey ME, Holcomb JB, Fagan SP, Kwong KL, Dorlac GR, Schreiber MA, Persse DE, Moore FA, Mattox KL. Mortality from isolated civilian penetrating extremity injury. J Trauma. 2005 Jul;59(1):217-22.

Oklahoma State Department of Health

Emergency Medicine University of Oklahoma

EMS DIVISION

10I – HEMOSTATIC AGENTS ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Hemorrhage control
2. Vital signs

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

BLEEDING CONTROL
ADVISE DIRECT PRESSURE ON BLEEDING WOUND
HOLD FIRMLY UNTIL HELP ARRIVES

EMR / EMT

GENERAL SUPPORTIVE CARE (MEDICAL PT) OR TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE (TRAUMA PT)
HISTORY TO INCLUDE IF PT TAKING ANTIPLATELET AGENT (eg. ASPIRIN) OR ANTICOAGULANT (eg. WARFARIN)

BLEEDING CONTROL
IF EXTREMITY WOUND AND TOURNIQUET INDICATED, TREAT PER PROTOCOL 10H – TOURNIQUET
APPLY DIRECT PRESSURE AS INDICATED – MANUAL &/OR VIA PRESSURE DRESSING
IF DIRECT PRESSURE INSUFFICIENT & BLEEDING IS ARTERIAL/BRISK, APPLY TOPICAL HEMOSTATIC AGENT
MAINTAIN DIRECT PRESSURE WHEN USING TOPICAL HEMOSTATIC AGENT
ADVISE RECEIVING PHYSICIANS/NURSES IF HEMOSTATIC AGENT USE WAS REQUIRED & TYPE USED

EMT-I85 / AEMT

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg
PEDIATRIC: REPEAT UP TO 60 mL/kg IF SYS BP REMAINS < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
10I – Hemostatic Agents– Adult & Pediatric

1. Schwartz RB, Reynolds BZ, Shiver SA, Lerner EB, Greenfield EM, Solis RA, Kimpel NA, Coule PL, McManus JG.Comparison of two packable hemostatic Gauze dressings in a porcine hemorrhage model.PrehospEmerg Care. 2011 Oct-Dec;15(4):477-82.
2. Littlejohn LF, Devlin JJ, Kircher SS, Lueken R, Melia MR, Johnson AS.Comparison of Celox-A, ChitoFlex, WoundStat, and combat gauze hemostatic agents versus standard gauze dressing in control of hemorrhage in a swine model of penetrating trauma.AcadEmerg Med. 2011 Apr;18(4):340-50.
3. Granville-Chapman J, Jacobs N, Midwinter MJ.Pre-hospital haemostatic dressings: a systematic review.Injury. 2011 May;42(5):447-59.
4. Achneck HE, Sileshi B, Jamiolkowski RM, Albala DM, Shapiro ML, Lawson JH.A comprehensive review of topical hemostatic agents: efficacy and recommendations for use.Ann Surg. 2010 Feb;251(2):217-28.
5. Cox ED, Schreiber MA, McManus J, Wade CE, Holcomb JB.New hemostatic agents in the combat setting.Transfusion. 2009 Dec;49Suppl 5:248S-55S.
6. Kheirabadi BS, Scherer MR, Estep JS, Dubick MA, Holcomb JB.Determination of efficacy of new hemostatic dressings in a model of extremity arterial hemorrhage in swine.J Trauma. 2009 Sep;67(3):450-9; discussion 459-60.
7. Sohn VY, Eckert MJ, Martin MJ, Arthurs ZM, Perry JR, Beekley A, Rubel EJ, Adams RP, Bickett GL, Rush RM Jr.Efficacy of three topical hemostatic agents applied by medics in a lethal groin injury model.J Surg Res. 2009 Jun 15;154(2):258-61.
8. Mabry R, McManus JG.Prehospital advances in the management of severe penetrating trauma.J Spec Oper Med. 2009 Spring;9(2):93-101.
9. Kheirabadi BS, Edens JW, Terrazas IB, Estep JS, Klemcke HG, Dubick MA, Holcomb JB.Comparison of new hemostatic granules/powders with currently deployed hemostatic products in a lethal model of extremity arterial hemorrhage in swine.J Trauma. 2009 Feb;66(2):316-26; discussion 327-8.
10. Kozen BG, Kircher SJ, Henao J, Godinez FS, Johnson AS.An alternative hemostatic dressing: comparison of CELOX, HemCon, and QuikClot.AcadEmerg Med. 2008 Jan;15(1):74-81.
11. Ward KR, Tiba MH, Holbert WH, Blocher CR, Draucker GT, Proffitt EK, Bowlin GL, Ivatury RR, Diegelmann RF.Comparison of a new hemostatic agent to current combat hemostatic agents in a Swine model of lethal extremity arterial hemorrhage.J Trauma. 2007 Aug;63(2):276-83; discussion 283-4.

10J – COMPARTMENT SYNDROME ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Vital signs
2. 5 Ps exam
3. Hospital notification of concern regarding limb circulation compromise
4. Analgesia (if required)

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

DO NOT MOVE THE PATIENT UNLESS IN DANGER
CONTROL BLEEDING WITH DIRECT PRESSURE
DO NOT ATTEMPT TO SPLINT INJURIES

EMR / EMT

TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE
OBTAIN VITAL SIGNS

HISTORY OF TRAUMA IN EXTREMITY IN PAST DAYS OR ACUTELY THAT COULD CAUSE PRESSURE TO BUILD IN DEEP SPACES OF EXTREMITY?
(MUSCLE OR TISSUE SWELLING? DEEP SPACE BLEEDING?)

EVALUATE EXTREMITY FOR "5 Ps" OF COMPARTMENT SYNDROME:
PAIN OUT OF PROPORTION TO ASSESSED INJURY (APPEARS MINOR INJURY, PATIENT IN EXCRUCIATING PAIN)?
PARESTHESIA (NUMBNESS DUE TO NERVE COMPRESSION)?
PRESSURE (SKIN/MUSCLE FEELS TENSE DUE TO INCREASING FORCE WITHIN COMPARTMENT)?
PARALYSIS (LATE SIGN DUE TO NERVE COMPRESSION - DON'T WAIT ON PARALYSIS TO REPORT CONCERN)
PULSELESSNESS IN DISTAL EXTREMITY (LATE SIGN OF COMPARTMENT SYNDROME - DON'T WAIT ON ABSENT PULSE TO REPORT CONCERN)

IN SUSPECTED COMPARTMENT SYNDROME, POSITION EXTREMITY TO PROMOTE CIRCULATION TO DISTAL EXTREMITY

EMT-I85 / AEMT

IV ACCESS

PARAMEDIC

ANALGESIA (IF REQUIRED)
FOR OPIATE USE, ADULT MUST HAVE SYS BP ≥ 100 mmHg; PEDIATRIC MUST HAVE SYS BP ≥ (70 + 2x age in years) mmHg

ADULT: FENTANYL 1 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 100 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 3 mcg/kg or 250 mcg WHICHEVER IS LESSER.
OR
ADULT: MORPHINE SULFATE 2 - 4 mg SLOW IVP, MAY REPEAT 2 - 4 mg EVERY 5 MINUTES TO A TOTAL OF 10 mg.
OR
ADULT: HYDROMORPHONE 0.5 - 1 mg SLOW IVP, MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 2 mg.

PEDIATRIC: OLMCP ORDER ONLY

OLMCP CONSULT IF FURTHER ANALGESIA REQUIRED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
10J – Compartment Syndrome– Adult & Pediatric

1. Taylor RM, Sullivan MP, Mehta S.Acute compartment syndrome: obtaining diagnosis, providing treatment, and minimizing medicolegal risk.Curr Rev Musculoskelet Med. 2012 May 29. [Epub ahead of print]
2. Tekwani K, Sikka R.High-risk chief complaints III: abdomen and extremities.Emerg Med Clin North Am. 2009 Nov;27(4):747-65, x.
3. Olson SA, Glasgow RR.Acute compartment syndrome in lower extremity musculoskeletal trauma.J Am AcadOrthop Surg. 2005 Nov;13(7):436-44.
4. Grottkau BE, Epps HR, Di Scala C.Compartment syndrome in children and adolescents.J Pediatr Surg. 2005 Apr;40(4):678-82.

10K – CRUSH INJURY SYNDROME ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Personal safety
2. Patient safety
3. USAR (OK TF1) if needed
4. Vital signs
5. Hospital notification of concern regarding trunk/ limb circulation compromise
6. OLMCP consult on treatment plan prior to crush release (if > 2hours crush)
7. Hyperkalemia prophylaxis (If required)

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

DO NOT MOVE THE PATIENT UNLESS IN DANGER
CONTROL BLEEDING WITH DIRECT PRESSURE
DO NOT ATTEMPT TO SPLINT INJURIES

EMR / EMT

PERSONAL & PATIENT SAFETY
MOBILIZATION OF LOCAL FIRE-RESCUE PROFESSIONALS FOR TRAPPED PATIENTS REQUIRING HEAVY/COMPLICATED EXTRICATION
MOBILIZATION OF URBAN SEARCH & RESCUE SPECIALIST TEAM IF NUMEROUS TRAPPED PATIENTS/LARGE BUILDING OR TRENCH COLLAPSE
(OKLAHOMA TASK FORCE 1 IS BASED & SUPPORTED AT OKLAHOMA CITY FIRE DEPARTMENT & TULSA FIRE DEPARTMENT)

TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE
OBTAIN VITAL SIGNS

HISTORY OF ONGOING AND/OR PROLONGED CRUSH MECHANISM ON TRUNK OR PROXIMAL EXTREMITY
EVALUATE EXTREMITY FOR "5 Ps" OF COMPARTMENT SYNDROME PER PROTOCOL 10K
ECG MONITOR (if equipped)

EMT-I85 / AEMT

IV ACCESS (IO IF INDICATED)

IF CRUSH ≥ 4HRS IN DURATION:
ADULT: IV NS 1 LITER BOLUS THEN 250 mL/HR RATE IF NO SIGNS OF PULMONARY EDEMA
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS 20 mL/kg BOLUS THEN 5 mL/kg/HR RATE IF NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: REPEAT UP TO 60 mL/kg NS IF SYS BP REMAINS < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

IF CRUSH ≥ 4 HRS IN DURATION:
JUST PRIOR TO CRUSH MECHANISM REMOVAL, ADMINISTER HYPERKALEMIA PROPHYLAXIS:
IV FLUID HYDRATION AS ABOVE
CALCIUM CHLORIDE 10 mg/kg IVP/IOP (MAX 1 gram)
SODIUM BICARBONATE 1 mEq/kg IVP/IOP (MAX 50 mEq)

ANALGESIA (IF REQUIRED)
FOR OPIATE USE, ADULT MUST HAVE SYS BP ≥ 100 mmHg; PEDIATRIC MUST HAVE SYS BP ≥ (70 + 2x age in years) mmHg
ADULT: FENTANYL 1 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 100 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 3 mcg/kg or 250 mcg WHICHEVER IS LESSER.
OR
ADULT: MORPHINE SULFATE 2 - 4 mg SLOW IVP, MAY REPEAT 2 - 4 mg EVERY 5 MINUTES TO A TOTAL OF 10 mg.
OR
ADULT: HYDROMORPHONE 0.5 - 1 mg SLOW IVP, MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 2 mg.
PEDIATRIC: OLMCP ORDER ONLY

OLMCP CONSULT FOR TIMING/NEED FOR HYPERKALEMIA PROPHYLAXIS IF CRUSH < 4 HRS IN DURATION
OR IF FURTHER ANALGESIA REQUIRED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
10K – Crush Injury Syndrome– Adult & Pediatric

1. Burns K, Cone DC, Portereiko JV.Complex extrication and crush injury.PrehospEmerg Care. 2010 Apr-Jun;14(2):240-4.
2. Newton EJ, Love J.Acute complications of extremity trauma.Emerg Med Clin North Am. 2007 Aug;25(3):751-61, iv.
3. Sever MS, Vanholder R, Lameire N.Management of crush-related injuries after disasters.N Engl J Med. 2006 Mar 9;354(10):1052-63.

10L - BURNS ADULT & PEDIATRIC

TREATMENT PRIORITIES
1. Thermal Burn
   - Stop burning process
   - Flood with water only if flames not extinguished; smoldering present; significant heat being dissipated
   - Determine possibility of smoke/toxic inhalation
2. Chemical Burn
   - Brush off dry chemicals
   - Flush with water for minimum of 15 minutes
3. Electrical Burn
   - Evaluate airway and cardiac status

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

IF PT CLOTHES ARE BURNING OR SMOLDERING,
DOUSE THEM WITH WATER IMMEDIATELY.
IF WATER IS NOT AVAILABLE,
THEN ROLL PT ON THE GROUND OR SMOTHER THE FIRE
DO NOT TOUCH ANYTHING OR PICK UP DEBRIS

EMR / EMT

TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE
STOP THE BURNING PROCESS
SPINAL "STABILIZATION" - DO NOT APPLY SPINAL "TRACTION" DURING IMMOBILIZATION (IF EXPLOSIVE MOI & if applicable)
STABILIZE IMPALED OBJECTS (IF EXPLOSIVE MOI)
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE FOR RESPIRATORY SYMPTOMS
COVER BURNED AREA WITH BURN DRESSING (if equipped) THEN APPLY DRY SHEET
APPLY CARDIAC MONITOR (if equipped)

EMT OR HIGHER LICENSE:
FOR RESPIRATORY SYMPTOMS,
MEASURE END – TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, ** Mandatory use if pt intubated)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE.

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

IV/ IO ACCESS IF INDICATED
ADULT: IV NS; FOR MAJOR THERMAL BURNS, 250 mL BOLUS IF NO SIGNS OF PULMONARY EDEMA,
THEN 4 mL/kg BODY WEIGHT x % BSA BURNED
PEDIATRIC: IV NS 20mL/kg BOLUS IF NO SIGNS OF PULMONARY EDEMA, THEN 4mL/kg BODY WEIGHT x % BSA BURNED

PARAMEDIC

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED

ANALGESIA (IF REQUIRED)
FOR OPIATE USE, ADULT MUST HAVE SYS BP ≥ 100 mmHg; PEDIATRIC MUST HAVE SYS BP ≥ (70 + 2x age in years) mmHg

ADULT: FENTANYL 1 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 100 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 3 mcg/kg or 250 mcg WHICHEVER IS LESSER.
OR
ADULT: MORPHINE SULFATE 2 - 4 mg SLOW IVP, MAY REPEAT 2 - 4 mg EVERY 5 MINUTES TO A TOTAL OF 10 mg.
OR
ADULT: HYDROMORPHONE 0.5 - 1 mg SLOW IVP, MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 2 mg.

PEDIATRIC: OLMCP ORDER ONLY

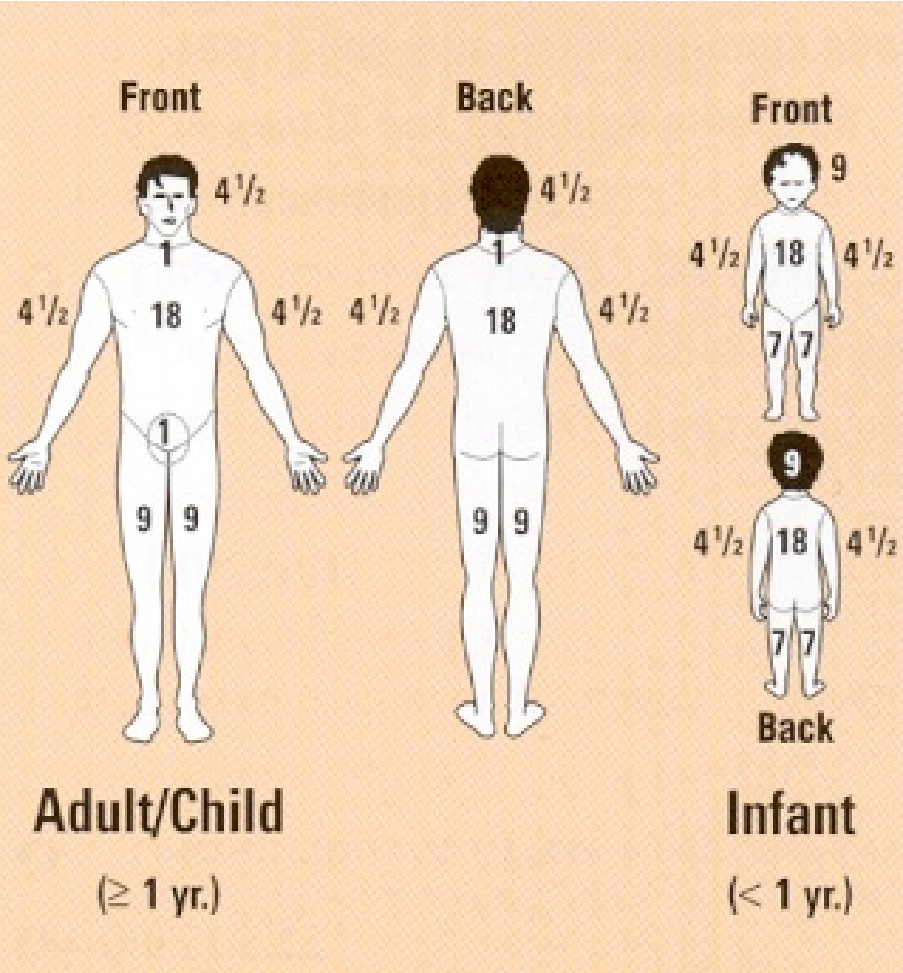
OLMCP CONSULT IF FURTHER ANALGESIA REQUIRED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

PROTOCOL 10L: Burns - Adult &Pediatric, cont,

% Body Surface Area (BSA) Estimation Chart

Count only Second and Third Degree Burns when calculating estimated %BSA



An alternate method of calculating %BSA involvement is to use the size of the patient's entire hand as equal to 1% of their BSA. This is a useful method when calculating smaller burn areas.

Medical Literature References
10L – Burns – Adult & Pediatric

1. Eastman AL, Arnoldo BA, Hunt JL, Purdue GF. Pre-burn center management of the burned airway: do we know enough? J Burn Care Res. 2010 Sep-Oct;31(5):701-5.
2. Singer AJ, Taira BR, Thode HC Jr, McCormack JE, Shapiro M, Aydin A, Lee C. The association between hypothermia, prehospital cooling, and mortality in burn victims. AcadEmerg Med. 2010 Apr;17(4):456-9.
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5. Crawford ME, Rask H. Prehospital care of the burned patient. Eur J Emerg Med. 1996 Dec;3(4):247-51.

10M - CONDUCTIVE ENERGY WEAPON RELATED MANAGEMENT ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Personal safety
2. Patient safety
3. Physical Restraint
4. Chemical Restraint (if indicated)
5. Vital signs
6. Probe removal

EMD

SUPPORT LAW ENFORCEMENT OPERATION

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMR | **EMT-B**

MAINTAIN PERSONAL AND PATIENT SAFETY
ENSURE LAW ENFORCEMENT OFFICER DISCONNECTS EMBEDDED PROBES FROM WEAPON

TREAT PER APPLICABLE SECTION 7 PROTOCOLS – PSYCHIATRIC/BEHAVIORAL DISORDERS

REMOVE PROBES UNLESS EMBEDDED IN FACE, NECK, GENITALS, SPINE
APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (if equipped)
TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT

EMT OR HIGHER LICENSE:
MEASURE END – TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, ** Mandatory use if pt intubated)

EMT-INTERMEDIATE 85 | **ADVANCED EMT**

ADULT: INTUBATE IF INDICATED

IV ACCESS

TREAT PER APPLICABLE SECTION 7 PROTOCOLS – PSYCHIATRIC/BEHAVIORAL DISORDERS

PARAMEDIC

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED

CHEMICAL RESTRAINT IF INDICATED PER PROTOCOL 7C – CHEMICAL RESTRAINT

CONSULT OLMC IF UNCERTAIN OF ETIOLOGY AND TREATMENT PLAN FOR PSYCHIATRIC PROBLEM OR IF ADDITIONAL RESTRAINT MEASURES NEEDED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
10M – Conductive Energy Weapon Related Management– Adult & Pediatric

1. Bozeman WP, Teacher E, Winslow JE. Transcardiac Conducted Electrical Weapon (TASER) Probe Deployments: Incidence and Outcomes. J Emerg Med. 2012 Jun 4. [Epub ahead of print].
2. Vilke GM, Bozeman WP, Dawes DM, Demers G, Wilson MP. Excited delirium syndrome (ExDS): treatment options and considerations. J Forensic Leg Med. 2012 Apr;19(3):117-21.
3. Kroll MW, Lakkireddy D, Rahko PS, Panescu D. Ventricular fibrillation risk estimation for conducted electrical weapons: critical convolutions. Conf Proc IEEE Eng Med Biol Soc. 2011;2011:271-7.
4. Pasquier M, Carron PN, Vallotton L, Yersin B. Electronic control device exposure: a review of morbidity and mortality. Ann Emerg Med. 2011 Aug;58(2):178-88.
5. Vilke GM, Bozeman WP, Chan TC. Emergency department evaluation after conducted energy weapon use: review of the literature for the clinician. J Emerg Med. 2011 May;40(5):598-604.
6. Vilke GM, Debard ML, Chan TC, Ho JD, Dawes DM, Hall C, Curtis MD, Costello MW, Mash DC, Coffman SR, McMullen MJ, Metzger JC, Roberts JR, Sztajnkrcer MD, Henderson SO, Adler J, Czarnecki F, Heck J, Bozeman WP. Excited Delirium Syndrome (ExDS): Defining Based on a Review of the Literature. J Emerg Med. 2011 Mar 24. [Epub ahead of print]
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8. Moscati R, Ho JD, Dawes DM, Miner JR. Physiologic effects of prolonged conducted electrical weapon discharge in ethanol-intoxicated adults. Am J Emerg Med. 2010 Jun;28(5):582-7.
9. Otahbachi M, Cevik C, Bagdure S, Nugent K. Excited delirium, restraints, and unexpected death: a review of pathogenesis. Am J Forensic Med Pathol. 2010 Jun;31(2):107-12.
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11. Brice JH, Pirrallo RG, Racht E, Zachariah BS, Krohmer J. Management of the violent patient. Prehosp Emerg Care. 2003 Jan-Mar;7(1):48-55.

10N – "LESS LETHAL" WEAPON RELATED MANAGEMENT ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Personal safety
2. Patient safety
3. Physical Restraint
4. Chemical Restraint (if indicated)
5. Vital signs
6. Appropriate trauma care destination selection

EMD

SUPPORT LAW ENFORCEMENT OPERATION

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMR | **EMT**

MAINTAIN PERSONAL AND PATIENT SAFETY
HISTORY FROM LAW ENFORCEMENT OFFICER(S) REGARDING WEAPON BALLISTICS
(eg. RUBBER BULLETS, BEAN BAG PROJECTILES)

TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE
TREAT PER OTHER APPLICABLE SECTION 10 PROTOCOLS - TRAUMA
TREAT PER APPLICABLE SECTION 7 PROTOCOLS – PSYCHIATRIC/BEHAVIORAL DISORDERS

APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (if equipped)
TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT

EMT OR HIGHER LICENSE:
MEASURE END – TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, ** Mandatory use if pt intubated)

EMT - I85 | **AEMT**

ADULT: INTUBATE IF INDICATED

IV ACCESS

PARAMEDIC

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED

CHEMICAL RESTRAINT IF INDICATED PER PROTOCOL 7C – CHEMICAL RESTRAINT

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
10N – "Less Lethal" Weapon Weapon Related Management– Adult & Pediatric

1. Bozeman WP, Teacher E, Winslow JE.Transcardiac Conducted Electrical Weapon (TASER) Probe Deployments: Incidence and Outcomes.J Emerg Med. 2012 Jun 4. [Epub ahead of print].
2. Vilke GM, Bozeman WP, Dawes DM, Demers G, Wilson MP.Excited delirium syndrome (ExDS): treatment options and considerations.J Forensic Leg Med. 2012 Apr;19(3):117-21.
3. Kroll MW, Lakkireddy D, Rahko PS, Panescu D.Ventricular fibrillation risk estimation for conducted electrical weapons: critical convolutions.ConfProc IEEE Eng Med Biol Soc. 2011;2011:271-7.
4. Pasquier M, Carron PN, Vallotton L, Yersin B.Electronic control device exposure: a review of morbidity and mortality.Ann Emerg Med. 2011 Aug;58(2):178-88.
5. Vilke GM, Bozeman WP, Chan TC.Emergency department evaluation after conducted energy weapon use: review of the literature for the clinician.J Emerg Med. 2011 May;40(5):598-604.
6. Vilke GM, Debard ML, Chan TC, Ho JD, Dawes DM, Hall C, Curtis MD, Costello MW, Mash DC, Coffman SR, McMullen MJ, Metzger JC, Roberts JR, Sztajnkrcer MD, Henderson SO, Adler J, Czarnecki F, Heck J, Bozeman WP.Excited Delirium Syndrome (ExDS): Defining Based on a Review of the Literature.J Emerg Med. 2011 Mar 24. [Epub ahead of print]
7. Strote J, Verzemnieks E, Walsh M, Hutson HR.Use of force by law enforcement: an evaluation of safetyand injury.J Trauma. 2010 Nov;69(5):1288-93.
8. Ho JD, Dawes DM, Nelson RS, Lundin EJ, Ryan FJ, Overton KG, Zeiders AJ, Miner JR.Acidosis and catecholamine evaluation following simulated law enforcement "use of force" encounters.AcadEmerg Med. 2010 Jul;17(7):e60-8.
9. Moscati R, Ho JD, Dawes DM, Miner JR.Physiologic effects of prolonged conducted electrical weapon discharge in ethanol-intoxicated adults.Am J Emerg Med. 2010 Jun;28(5):582-7.
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10O – SPLINTING OF INJURIES ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

10Oa: Axial/Spine with Selective Spinal Immobilization – Adult & Pediatric:

Many patients evaluated by EMS professionals are placed in a cervical collar and onto a long spine backboard for movement and transport based as much upon "tradition" steeped in training that this practice was without risk and the benefit was without question. Like many medical practices scrutinized over time, evidence-based medicine reveals it is with risk (pain, tissue damage leading to pressure sores, and concerns about risks of aspiration and impaired breathing mechanics). Similarly, the benefit is not quite as certain. Few "real" injuries are so unstable that the process of spinal immobilization as practiced in EMS is the difference-maker between paralysis and ambulation.

This protocol does not seek to avoid spinal immobilization. This protocol rather seeks to provide an evidence-based approach that directs the careful practice of spinal "stabilization" in situations where historical characteristics, exam findings, and/or patient interaction limitations make the benefits outweigh the risks. When the benefits do not outweigh the risks, patient should not incur clinically unnecessary collars and boards based upon tradition alone.

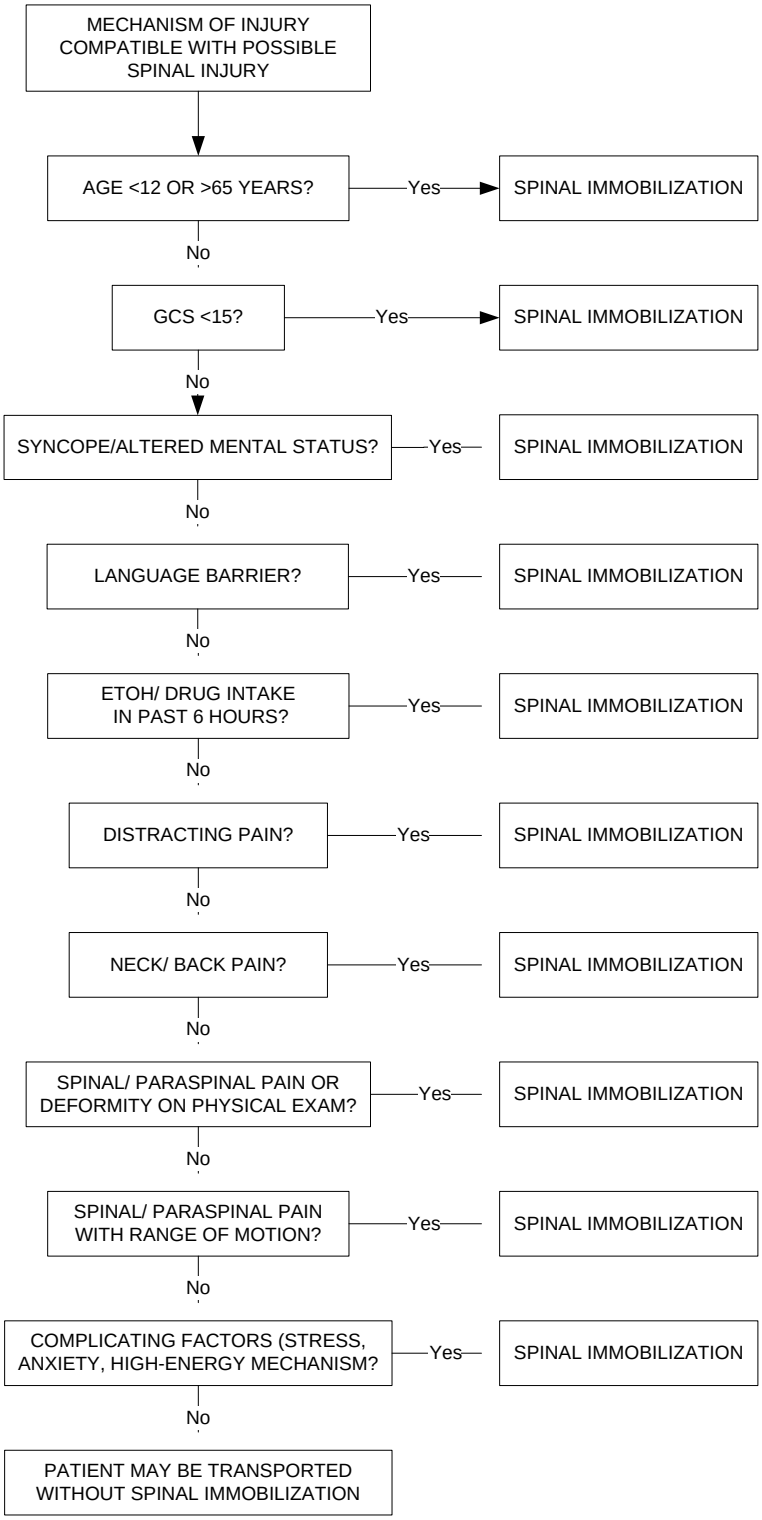
When applying spinal immobilization, include the following:

1. Avoid traction being placed on the spine in any direction.
2. Correctly size the cervical collar to additionally avoid traction being placed on the spine.
3. Maintain the spinal column integrity of alignment when rolling the patient onto a long back board, using a scoop stretcher, or placing/moving in any other spinal motion restriction device.
4. Secure the torso and extremities to the backboard first, the head/neck last.
5. Place appropriate straps and tape to achieve desired reduction in motion of spine.

Documentation of spinal immobilization should include a neurologic assessment before and after the process, which includes the application of a cervical collar, movement onto a backboard/stretcher, and securing the torso/extremities, then the head/neck using a lateral motion reduction device (eg. "headblocks") to the backboard/stretcher. In the seated patient that is hemodynamically stable and requiring spinal stabilization, use a spinal motion restriction device to help pivot and maneuver to a supine position on a long spine backboard.

PROTOCOL 10O: Splinting of Injuries, cont.

10Oa - Axial/Spine with Selective Spinal Immobilization – Adult & Pediatric, cont.



PROTOCOL 10O: Splinting of Injuries, cont.

10Oa - Axial/Spine with Selective Spinal Immobilization – Adult & Pediatric, cont.

Comments regarding the Selective Spinal Immobilization Process:

1. The process of EMS-performed selective spinal immobilization constitutes a formal step-wise screening of individuals suffering from mechanisms of injury compatible with possible injury to the spine. This process, widely adopted in EMS systems across the United States, is designed from research-verified assessments, identifying individuals that may be safely transported to an emergency department, without spinal immobilization, for further appropriate physician evaluation. IT DOES NOT CONSTITUTE FORMAL "CLEARING" OF THE SPINE.

2. Patients at age extremes are prone to unreliable history and physical assessments. Patients under the age of 12 years or over the age of 65 years, if they have suffered a mechanism of injury compatible with possible spinal injury, are to be placed in spinal immobilization.

3. The designation of a Glasgow Coma Scale score of 15 includes an assessment that no neurological deficits exist. If a patient is complaining of motor and/or sensory loss following a mechanism of injury compatible with possible spinal injury, that patient is to be placed in spinal immobilization.

4. At any point from sustaining an acute mechanism of injury compatible with possible spinal injury through EMS care, if the patient has a reported loss of consciousness or altered mental status, regardless of normal mental status upon EMS contact and assessment, that patient is to be placed in spinal immobilization.

5. A language barrier exists if the EMS professional and the patient cannot fluently communicate. Fragmented communication ("broken" language) or the use of a family member or bystander to communicate with the patient does not constitute fluent communication. If the EMS professional has a language barrier with the patient following an injury involving a mechanism compatible with possible spinal injury, that patient is to be placed in spinal immobilization.

6. Regardless of apparent "soberness" on assessment, if a patient has ingested ethanol or mental-status altering drugs (e.g. narcotics, benzodiazepines, barbiturates, marijuana, cocaine) within six hours prior to a mechanism of injury compatible with possible spinal injury, that patient is to be placed in spinal immobilization.

7. Distracting pain or injury is best defined as an injury in which the patient is repetitively fixated upon to the extent the history and physical assessment is frequently interrupted to address that injury. The EMS professional must use his or her best judgment and anytime a concern exists that an injury may prove distracting to a patient with a mechanism of injury compatible with possible spinal injury, that patient is to be placed in spinal immobilization.

PROTOCOL 10O: Splinting of Injuries, cont.

10Oa - Axial/Spine with Selective Spinal Immobilization – Adult & Pediatric, cont.

Comments regarding the Selective Spinal Immobilization Process, cont:

8. If a patient suffering a mechanism of injury compatible with possible spinal injury complains of pain in the spinal or paraspinal area anywhere from the base of the skull to the coccyx, that patient is to be placed in spinal immobilization.

9. In the physical examination of a patient suffering a mechanism of injury compatible with possible spinal injury, if the EMS professional discovers spinal or paraspinal pain or deformity upon palpation, that patient is to be placed in spinal immobilization.

10. In the physical examination of a patient suffering a mechanism of injury compatible with possible spinal injury, if the patient complains of spinal or paraspinal pain with either flexion, extension, or lateral rotation of the neck or back, that patient is to be placed in spinal immobilization.

11. If the EMS professional judges a complicating factor (e.g. patient stress or anxiety, the energy or nature of the mechanism of injury) to be present or significantly concerning, that patient is to be placed in spinal immobilization. If any doubt exists in the view of the EMS professional as to whether to immobilize the patient, that patient is to be placed in spinal immobilization.

12. An instance may occur when a patient has been deemed safe for transport without spinal immobilization using this protocol and the patient subsequently develops neck or back pain in the ambulance during transport to an emergency department. The EMS professional must use his or her best judgment factoring the degree of pain verbalized and the remaining transport route and time in deciding when to immobilize the patient. As a guideline, if the remaining route involves unusually rough highway or will be prolonged beyond several minutes duration, the EMS crew should temporarily stop transportation and immobilize the patient in the ambulance unless the patient's condition is otherwise unstable and requires continued emergency transport. As a guideline, if the arrival at the destination emergency department is imminent, the patient may be immobilized upon hospital arrival, using emergency department-based colleagues as available. In each instance, the EMS professional should inform the receiving nurse or physician of the events and timing of immobilization and appropriately reflect the events in the patient care report.

13. Any utilization of the selective spinal immobilization protocol should be clearly documented in the patient care report, with each requirement in this process denoted.

14. An instance may occur when a patient that is to be spinal immobilized by this protocol absolutely refuses such immobilization. These are, indeed, difficult circumstances. If repeated attempts to secure the cooperation of the patient fail, guidance from OLMC should be sought. If such a patient is transported without spinal immobilization by the direction of the OLMC, detailed documentation of the immobilization attempts, OLMC consultation and direction, and subsequent actions is to be contained in the patient care report.

PROTOCOL 10O: Splinting of Injuries, cont.

10Ob – Extremity – Adult & Pediatric:

When applying extremity splinting, include the following:

1. Assess and document the assessment of distal vascular (pulse) and nerve (motor/sensation) function, before and after splinting.

2. In general, immobilize the joint on either side of the suspected fracture area.

3. Pad splints whenever possible to avoid tissue pressure from splints.

4. In the setting of that an extremity is pulseless distal to a markedly angulated fracture, make one gentle attempt to place the angulated extremity in near-normal alignment. Document the distal vascular and nerve function before and after any such maneuver.

5. Prioritize timely transport to an appropriate emergency department for extremity injuries with pulselessness distal to the suspected fracture/injury.

Medical Literature References
10O – Splinting of Injuries– Adult & Pediatric

1. Stuke LE, Pons PT, Guy JS, Chapleau WP, Butler FK, McSwain NE. Prehospital spine immobilization for penetrating trauma--review and recommendations from the Prehospital Trauma Life Support Executive Committee. J Trauma. 2011 Sep;71(3):763-9; discussion 769-70.
2. Horodyski M, Conrad BP, Del Rossi G, DiPaola CP, Rechtine GR 2nd. Removing a patient from the spine board: is the lift and slide safer than the log roll? J Trauma. 2011 May;70(5):1282-5; discussion 1285.
3. Lador R, Ben-Galim P, Hipp JA. Motion within the unstable cervical spine during patient maneuvering: the neck pivot-shift phenomenon. J Trauma. 2011 Jan;70(1):247-50; discussion 250-1.
4. Del Rossi G, Rechtine GR, Conrad BP, Horodyski M. Are scoop stretchers suitable for use on spine-injured patients? Am J Emerg Med. 2010 Sep;28(7):751-6.
5. Ben-Galim P, Dreiangel N, Mattox KL, Reitman CA, Kalantar SB, Hipp JA. Extrication collars can result in abnormal separation between vertebrae in the presence of a dissociative injury. J Trauma. 2010 Aug;69(2):447-50.
6. Haut ER, Kalish BT, Efron DT, Haider AH, Stevens KA, Kieninger AN, Cornwell EE 3rd, Chang DC. Spine immobilization in penetrating trauma: more harm than good? J Trauma. 2010 Jan;68(1):115-20; discussion 120-1.
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8. Burton JH, Harmon NR, Dunn MG, Bradshaw JR. EMS provider findings and interventions with a statewide EMS spine-assessment protocol. PrehospEmerg Care. 2005 Jul-Sep;9(3):303-9.
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12. Viccellio P, Simon H, Pressman BD, Shah MN, Mower WR, Hoffman JR; NEXUS Group. A prospective multicenter study of cervical spine injury in children. Pediatrics. 2001 Aug;108(2):E20.
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14. Hauswald M, McNally T. Confusing extrication with immobilization: the inappropriate use of hard spine boards for interhospital transfers. Air Med J. 2000 Oct-Dec;19(4):126-7.
15. Perry SD, McLellan B, McIlroy WE, Maki BE, Schwartz M, Fernie GR. The efficacy of head immobilization techniques during simulated vehicle motion. Spine. 1999 Sep 1;24(17):1839-44.
16. McHugh TP, Taylor JP. Unnecessary out-of-hospital use of full spinal immobilization. AcadEmerg Med. 1998 Mar;5(3):278-80.
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SECTION 11

ENVIRONMENTAL

11A - HEAT ILLNESS ADULT & PEDIATRIC

TREATMENT PRIORITIES
1. Cooling therapy
2. Vital signs
3. Fluid resuscitation

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

REMOVE ANY SOURCES OF HEAT.
REMOVE OUTER CLOTHING.
APPLY COOL WATER TO ENTIRE SKIN SURFACE WHILE FANNING.
TURN ON AN AIR CONDITIONER OR FAN.

EMR / EMT

GENERAL SUPPORTIVE CARE
REMOVE FROM HOT ENVIRONMENT
COOL BODY INCLUDING HEAD WITH WATER OR SALINE
APPLY ICE PACKS TO GROIN, NECK, AXILLA
DIRECT FAN ON PATIENT TO PROMOTE EVAPORATIVE COOLING/AVOID SHIVERING
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR (if equipped)

EMT OR HIGHER LICENSE:
MEASURE END – TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, **Mandatory use if pt intubated)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

IV ACCESS
ADULT: IV NS 500 mL BOLUS IF NO SIGNS OF PULMONARY EDEMA.
USE CHILLED NS (when available) IF HEAT STROKE SUSPECTED
ADULT: REPEAT UP TO 2 LITERS NS IF FATIGUE, ALTERED MENTAL STATUS, &/OR HYPOTENSION < 100 mmHg PERSISTS IF NO SIGNS OF PULMONARY EDEMA

PEDIATRIC: IV NS 20 mLkg BOLUS IF NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: REPEAT UP TO 60 mL/kg IF FATIGUE, ALTERED MENTAL STATUS, &/OR HYPOTENSION < (70 + 2x age in years) mmHg PERSISTS IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED

ADULT: MIDAZOLAM 0.1 mg/kg IM/IVP/IN/IOP TO MAX OF 5 mg FOR ACTIVE SEIZURE. MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING.
OR
ADULT: DIAZEPAM 5 mg IVP/IOP or 10 mg IM FOR ACTIVE SEIZURE. MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING.
OR
ADULT: LORAZEPAM 2 mg IVP/IOP/IM FOR ACTIVE SEIZURE. MAY REPEAT X 1 IN 10 MINS IF STILL SEIZING.

PEDIATRIC: MIDAZOLAM 0.1 mg/kg IM/IVP/IN/IOP TO MAX OF 5 mg FOR ACTIVE SEIZURE. MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING.
OR
PEDIATRIC: DIAZEPAM 0.1 mg/kg TO MAX OF 5 mg IVP/IOP/IM FOR ACTIVE SEIZURE. MAY REPEAT X 1 IN 5 MINS IF STILL SEIZING.
OR
PEDIATRIC: LORAZEPAM 0.1 mg/kg TO MAX OF 2 mg IVP/IOP/IM FOR ACTIVE SEIZURE. MAY REPEAT X 1 IN 10 MINS IF STILL SEIZING.

OLMCP CONSULT IF SEIZURE CONTINUES DESPITE ABOVE TREATMENT

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
11A – Heat Illness – Adult & Pediatric

1. Centers for Disease Control and Prevention (CDC). Nonfatal sports and recreation heat illness treated in hospital emergency departments--United States, 2001-2009. MMWR Morb Mortal Wkly Rep. 2011 Jul 29;60(29):977-80.
2. Zeller L, Novack V, Barski L, Jotkowitz A, Almog Y. Exertional heatstroke: clinical characteristics, diagnostic and therapeutic considerations. Eur J Intern Med. 2011 Jun;22(3):296-9.

11B - COLD ILLNESS/INJURY ADULT & PEDIATRIC

TREATMENT PRIORITIES
1. Warming therapy
2. Vital signs
3. Modified cardiac arrest resuscitation (when applicable)

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

PROTECT FROM COLD
REMOVE WET CLOTHING
WARM WITHOUT RUBBING AFFECTED AREAS
DO NOT GIVE ALCOHOL TO DRINK

EMR / EMT

GENERAL SUPPORTIVE CARE
REMOVE FROM COLD ENVIRONMENT
REMOVE WET/RESTRICTIVE CLOTHING
APPLY HEAT PACKS TO GROIN, NECK, AXILLA
COVER PATIENT WITH BLANKETS TO EXTENT CLINICALLY POSSIBLE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE (WARM & HUMIDIFIED O_2 if equipped)
APPLY CARDIAC MONITOR (if equipped)

UNRESPONSIVE HYPOTHERMIA PATIENT STATUS?
ASSESS BREATHING/PULSE FOR UP TO 45 SECONDS
PERFORM CPR IF IN CARDIOPULMONARY ARREST
IF DEFIBRILLATION ADVISED BY AED, LIMIT TO ONE DEFIBRILLATION UNTIL WARMED

FROSTBITE?
APPLY LOOSE STERILE DRESSINGS AND SPLINT INVOLVED EXTREMITIES

EMT OR HIGHER LICENSE:
MEASURE END – TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, **Mandatory use if pt intubated)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

IV ACCESS
ADULT: IV NS (WARMED UP TO 43°C (109°F) if available) 500 mL BOLUS IF NO SIGNS OF PULMONARY EDEMA.
ADULT: REPEAT UP TO 2 LITERS NS IF PT TEMP <30°C (<86°F), ALTERED MENTAL STATUS, &/OR HYPOTENSION < 100 mmHg PERSISTS IF NO SIGNS OF PULMONARY EDEMA

PEDIATRIC: IV NS 20 mL/kg BOLUS (WARMED AS PER ADULT if available) IF NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: REPEAT UP TO 60 mL/kg IF PT TEMP <30°C (<86°F), ALTERED MENTAL STATUS, &/OR HYPOTENSION < (70 + 2x age in years) mmHg PERSISTS IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED

HYPOTHERMIC CARDIAC ARREST?

ADULT/PEDIATRIC: WITH BODY TEMPERATURE <30°C (<86°F)
CONTINUE CPR, WITHHOLD MEDICATIONS, LIMIT TO A SINGLE DEFIBRILLATION FOR VENTRICULAR FIBRILLATION/PULSELESS VT

ADULT/PEDIATRIC: WITH BODY TEMPERATURE ≥30°C (≥86°F)
CONTINUE CPR, ADMINISTER DYSRHYTHMIA APPLICABLE MEDICATIONS AT 10 MINUTE INTERVALS
AS CORE TEMPERATURE RISES, DEFIBRILLATE PER NORMAL BODY TEMPERATURE INTERVALS

CONTINUE REWARMING MEASURES UNTIL ROSC OR OLMCP AUTHORIZES TERMINATION OF RESUSCITATION

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
11B – Cold Illness/Injury – Adult & Pediatric

1. VandenHoek TL, Morrison LJ, Shuster M, Donnino M, Sinz E, Lavonas EJ, Jeejeebhoy FM, Gabrielli A. Part 12: cardiac arrest in special situations: 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Circulation. 2010;122(suppl 3):S829–S861.
2. Henriksson O, Lundgren JP, Kuklane K, Holmér I, Bjornstig U. Protection against cold in prehospital care-thermal insulation properties of blankets and rescue bags in different wind conditions. Prehosp Disaster Med. 2009 Sep-Oct;24(5):408-15.
3. Lundgren JP, Henriksson O, Pretorius T, Cahill F, Bristow G, Chochinov A, Pretorius A, Bjornstig U, Giesbrecht GG. Field torso-warming modalities: a comparative study using a human model. PrehospEmerg Care. 2009 Jul-Sep;13(3):371-8.
4. Cagle A, Hubbard R. Cold-related cardiac mortality in King County, Washington, USA 1980-2001. Ann Hum Biol. 2005 Jul-Aug;32(4):525-37.
5. Ulrich AS, Rathlev NK. Hypothermia and localized cold injuries. Emerg Med Clin North Am. 2004 May;22(2):281-98.

11C ELECTRICAL/LIGHTNING INJURY ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Personnel safety
2. Patient safety
3. Oxygenation/Ventilation
4. Chest compressions and defibrillation (when applicable)
5. Vital signs
6. Red/Priority 1 patient, even in setting of MCI

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

SEND FOR AED IF AVAILABLE FOR UNCONSCIOUS PATIENT
BEWARE OF ELECTRICAL RISKS AND ELECTRIFIED WATER
TURN – OFF ELECTRICAL POWER IF SAFELY CAPABLE
ATTEMPT RESCUE ONLY IF SAFELY CAPABLE
CPR BY EMD INSTRUCTION IF INDICATED

EMR / EMT

MAINTAIN PERSONNEL AND PATIENT SAFETY
STOP BURNING PROCESS
GENERAL SUPPORTIVE CARE/CARDIOPULMONARY RESUSCITATION PER APPLICABLE PROTOCOLS
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (if equipped)
TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT
COVER BURNED AREA WITH BURN DRESSING (if equipped) THEN APPLY DRY SHEET

EMT OR HIGHER LICENSE: MEASURE END – TIDAL CO_2 & MONITOR CAPNOGRAPH (if equipped, ** Mandatory use if pt intubated)
PLACE SUPRAGLOTTIC AIRWAY IF INDICATED AND ONLY IF BVM VENTILATION DIFFICULT/INEFFECTIVE

EMT-I85 / AEMT

INTUBATE IF INDICATED

IV ACCESS
ADULT: IV NS; FOR MAJOR THERMAL BURNS, 250 mL BOLUS if NO PULMONARY EDEMA, THEN 4 mL/kg/BODY WEIGHT x % BSA BURNED
PEDIATRIC: IV NS 20 mL/kg BOLUS THEN 4 mL/kg/BODY WEIGHT x % BSA BURNED

PARAMEDIC

TREAT CARDIAC ARREST AND SPECIFIC RHYTHM MANAGEMENT PER APPLICABLE PROTOCOL(S)

MEDICATION ASSISTED INTUBATION IF INDICATED

ANALGESIA IF REQUIRED
FOR OPIATE USE, ADULT MUST HAVE SYS BP ≥ 100 mmHg; PEDIATRIC MUST HAVE SYS BP ≥ (70 + 2x age in years) mmHg

FENTANYL 1 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 100 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 3 mcg/kg or 250 mcg WHICHEVER IS LESSER.
OR
MORPHINE SULFATE 2 - 4 mg SLOW IVP, MAY REPEAT 2 - 4 mg EVERY 5 MINUTES TO A TOTAL OF 10 mg.
OR
HYDROMORPHONE 0.5 - 1 mg SLOW IVP .
MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 2 mg.

OLMCP CONSULT IF FURTHER ANALGESIA REQUIRED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
11C – Lightning/Electrical Injury – Adult & Pediatric

1. Pfortmueller CA, Yikun Y, Haberkern M, Wuest E, Zimmermann H, Exadaktylos AK. Injuries, sequelae, and treatment of lightning-induced injuries: 10 years of experience at a swiss trauma center. Emerg Med Int. 2012;2012:167698. Epub 2012 May 13.
2. Vanden Hoek TL, Morrison LJ, Shuster M, Donnino M, Sinz E, Lavonas EJ, Jeejeebhoy FM, Gabrielli A. Part 12: cardiac arrest in special situations: 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Circulation. 2010;122(suppl 3):S829–S861.
3. Ritenour AE, Morton MJ, McManus JG, Barillo DJ, Cancio LC. Lightning injury: a review. Burns. 2008 Aug;34(5):585-94.
4. Maghsoudi H, Adyani Y, Ahmadian N. Electrical and lightning injuries. J Burn Care Res. 2007 Mar-Apr;28(2):255-61.

11D - WATER SUBMERSION EVENTS ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES

1. Rescue safety
2. Oxygenation/Ventilation
3. Assessment/Care for life-threatening injuries and/or cardiac arrest
4. Vital signs
5. Appropriate trauma care destination selection if injury present

EMD

RESCUE ONLY IF SAFE TO ATTEMPT
IF DIVING ACCIDENT, AVOID ALL UNNECESSARY MOVEMENT
STABILIZE HEAD AND NECK IN POSITION FOUND
OPEN AIRWAY IF NOT ALERT & INEFFECTIVE BREATHING

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE

UTILIZE APPROPRIATE PRECAUTIONS USING POWERED DEVICE(S) ON WET PATIENT
APPLY CARDIAC MONITOR (if equipped)

EMT OR HIGHER LICENSE:
MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped; **Mandatory use if pt intubated)
ADULT: APPLY Bi/CPAP IF INDICATED (if equipped)

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

ESTABLISH IV ACCESS

PARAMEDIC

EVALUATE ETIOLOGY OF WATER SUBMERSION – TREAT PER APPLICABLE PROTOCOL(S)
TREAT CARDIAC ARREST AND SPECIFIC RHYTHM MANAGEMENT PER APPLICABLE PROTOCOL(S)

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED

COLD WATER SUBMERSION CARDIAC ARREST: REWARMING MEASURES/RESUSCITATION/TRANSPORT
WARM WATER SUBMERSION CARDIAC ARREST: EVALUATE RESUSCITATION/TRANSPORT UTILITY PER PROTOCOL

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
11D – Water Submersion Events – Adult & Pediatric

1. Ferguson JD, De Guzman J. Cardiac arrest in special populations. Emerg Med Clin North Am. 2012 Feb;30(1):169-78.
2. Diamond W, MacDonald RD. Submersion and early-onset acute respiratory distress syndrome: a case report. Prehosp Emerg Care. 2011 Apr-Jun;15(2):288-93.
3. Vanden Hoek TL, Morrison LJ, Shuster M, Donnino M, Sinz E, Lavonas EJ, Jeejeebhoy FM, Gabrielli A. Part 12: cardiac arrest in special situations: 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Circulation. 2010;122(suppl 3):S829–S861.
4. Youn CS, Choi SP, Yim HW, Park KN. Out-of-hospital cardiac arrest due to drowning: An Utstein Style report of 10 years of experience from St. Mary's Hospital. Resuscitation. 2009 Jul;80(7):778-83.
5. Layon AJ, Modell JH. Drowning: Update 2009. Anesthesiology. 2009 Jun;110(6):1390-401.

SECTION 12

FIREGROUND - RELATED

12A – FIREGROUND REHABILITATION CONCEPTS ADULT

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:

Active fireground operations in which physiologic stress is exerted upon firefighters.

Contraindications:

None

Clinical Pearls:

1. Fireground operations place significant physiologic stress upon firefighters. Even in seemingly "normal" weather (absence of temperature extremes, absence of precipitation) during operations on even terrain, conducted by ample numbers of firefighters, the elevated body temperatures and physical stress experienced from exertion while wearing heavy protective clothing should not be underestimated. Early and effective rehabilitation promotes desired fire fighter safety on the fireground.

2. The "basics" of effective fireground rehabilitation include:
   a. medical monitoring of fire fighters at rehab entry, during rehab, and at rehab release;
   b. returning body temperatures to near normal (cooling in heat; warming in cold);
   c. hydration and electrolyte replacement;
   d. Incident Command support of preventing fire fighter return to fireground duty until medically appropriate.

3. Fireground rehabilitation operations conducted by EMS organizations should be performed in close cooperation with involved fire departments and with knowledge of the rehabilitation policies of those fire departments. Section 19 contains current fireground rehabilitation policies utilized by the Tulsa Fire Department as resource documents in assisting other EMS organizations and fire departments in Oklahoma (courtesy Tulsa Fire Department).

PROTOCOL 12A: Fireground Rehabilitation Concepts, cont.

4. In addition to the medical literature references for this protocol, additional fireground rehabilitation resources are available through the US Fire Administration, National Fire Protection Agency, International Association of Fire Chiefs, and International Association of Fire Fighters. Suggested resources that may prove helpful in designing and conducting effective fireground rehabilitation operations include:

   U.S. Fire Administration, Emergency Incident Rehabilitation, February 2008
   http://www.usfa.fema.gov/downloads/pdf/publications/fa_314.pdf

   NFPA 1584: Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises, 2008 Edition

   www.firerehab.com

Medical Literature References
12A – Fireground Rehabilitation Concepts - Adult

1. Pryor RR, Seitz JR, Morley J, Suyama J, Guyette FX, Reis SE, Hostler D. Estimating core temperature with external devices after exertional heat stress in thermal protective clothing. Prehosp Emerg Care. 2012 Jan;16(1):136-41.
2. Horn GP, Gutzmer S, Fahs CA, Petruzzello SJ, Goldstein E, Fahey GC, Fernhall B, Smith DL. Physiological recovery from firefighting activities in rehabilitation and beyond. Prehosp Emerg Care. 2011 Apr-Jun;15(2):214-25.
3. Hostler D, Reis SE, Bednez JC, Kerin S, Suyama J. Comparison of active cooling devices with passive cooling for rehabilitation of firefighters performing exercise in thermal protective clothing: a report from the Fireground Rehab Evaluation (FIRE) trial. Prehosp Emerg Care. 2010 Jul-Sep;14(3):300-9.
4. Hostler D, Bednez JC, Kerin S, Reis SE, Kong PW, Morley J, Gallagher M, Suyama J. Comparison of rehydration regimens for rehabilitation of firefighters performing heavy exercise in thermal protective clothing: a report from the fireground rehab evaluation (FIRE) trial. Prehosp Emerg Care. 2010 Apr-Jun;14(2):194-201.
5. Dickinson ET, Bevilacqua JJ, Hill JD, Sites FD, Wurster FW, Mechem CC. The utility of tympanic versus oral temperature measurements of firefighters in emergency incident rehabilitation operations. Prehosp Emerg Care. 2003 Jul-Sep;7(3):363-7.

12B – SMOKE INHALATION ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Personal safety
2. Patient safety
3. Vital signs (including EtCO2, if equipped)
4. Oxygenation support
   - O_2 by NC, NRB
   - BVM, Bi/CPAP, ETT if indicated
5. Ventilation support
   - BVM, Bi/CPAP, ETT if indicated
6. Nebulization therapy
   - Albuterol

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

DIRECT TO MOVE AWAY FROM SMOKE IF SAFE TO DO SO
OPEN AIRWAY IF NOT ALERT & INEFFECTIVE BREATHING
IF AWAKE, AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
ADVISE PT SELF-ADMINISTRATION OF MEDICATIONS
(eg. ALBUTEROL INHALER)
IF PREVIOUSLY PRESCRIBED FOR SIMILAR SYMPTOMS

EMR / EMT

MAINTAIN PERSONAL & PATIENT SAFETY
GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC, NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR (if equipped)
ASSIST PT WITH PT'S OWN ALBUTEROL INHALER/NEBULIZER (when applicable)
TREAT PER 12C – CARBON MONOXIDE &/0R 12E – CYANIDE AS APPLICABLE

EMT OR HIGHER LICENSE:

MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped)
ADULT: APPLY Bi/CPAP IF INDICATED (if equipped)

ADULT & PEDIATRIC WEIGHT ≥15kg: NEBULIZED ALBUTEROL 5mg
PEDIATRIC WEIGHT <15kg: NEBULIZED ALBUTEROL 2.5mg
MAY REPEAT ALBUTEROL ENROUTE X 1 AS NEEDED

PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED
CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
12B – Smoke Inhalation - Adult & Pediatric

1. Bledsoe BE, Anderson E, Hodnick R, Johnson L, Johnson S, Dievendorf E. Low-fractional oxygen concentration continuous positive airway pressure is effective in the prehospital setting. PrehospEmerg Care. 2012 Apr-Jun;16(2):217-21.
2. O'Brien DJ, Walsh DW, Terriff CM, Hall AH.Empiric management of cyanide toxicity associated with smoke inhalation.Prehosp Disaster Med. 2011 Oct;26(5):374-82.
3. Warner GS. Evaluation of the effect of prehospital application of continuous positive airway pressure therapy in acute respiratory distress. Prehosp Disaster Med. 2010 Jan-Feb; 25(1): 87-91.
4. Cone DC, MacMillan D, Parwani V, Van Gelder C.Threats to life in residential structure fires.PrehospEmerg Care. 2008 Jul-Sep;12(3):297-301.
5. Borron SW, Baud FJ, Barriot P, Imbert M, Bismuth C.Prospective study of hydroxocobalamin for acute cyanide poisoning in smoke inhalation.Ann Emerg Med. 2007 Jun;49(6):794-801, 801.e1-2.
6. Hall AH, Dart R, Bogdan G.Sodium thiosulfate or hydroxocobalamin for the empiric treatment of cyanide poisoning?Ann Emerg Med. 2007 Jun;49(6):806-13.
7. Eckstein M, Maniscalco PM.Focus on smoke inhalation--the most common cause of acute cyanide poisoning.Prehosp Disaster Med. 2006 Mar-Apr;21(2):s49-55.
8. Guidotti T.Acute cyanide poisoning in prehospital care: new challenges, new tools for intervention.Prehosp Disaster Med. 2006 Mar-Apr;21(2):s40-8.
9. Madnani DD, Steele NP, de Vries E.Factors that predict the need for intubation in patients with smoke inhalation injury.Ear Nose Throat J. 2006 Apr;85(4):278-80.
10. Markenson D, Foltin G, Tunik M, Cooper A, Treiber M, Caravaglia K. Albuterol sulfate administration by EMT-basics: results of a demonstration project. PrehospEmerg Care. 2004 Jan-Mar;8(1):34-40.
11. Kuo DC, Jerrard DA.Environmental insults: smoke inhalation, submersion, diving, and high altitude.Emerg Med Clin North Am. 2003 May;21(2):475-97, x.

12C – CARBON MONOXIDE ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Personal safety
2. Patient safety
3. Vital signs (including CO & EtCO2, if equipped)
4. Oxygenation support
   - O_2 by NC, NRB
   - BVM, Bi/CPAP, ETT if indicated
5. Ventilation support
   - BVM, Bi/CPAP, ETT if indicated
6. OLMC consult for hyperbaric oxygen use direction in serious exposures

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

DIRECT TO MOVE AWAY FROM SUSPECTED SOURCE
IF SAFE TO DO SO
OPEN AIRWAY IF NOT ALERT & INEFFECTIVE BREATHING
IF AWAKE, AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).

EMR / EMT

MAINTAIN PERSONAL & PATIENT SAFETY
GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 HIGH LITER PER MINUTE FLOW (15 LPM +) VIA NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR (if equipped)

MEASURE CARBON MONOXIDE LEVEL – %spCO (if equipped)
IF spCO% NORMAL & NO SYMPTOMS, TREAT PER OTHER APPLICABLE PROTOCOL(S)
IF spCO% ABNORMAL, EVALUATE IF SYMPTOMS INCLUDE ALTERED MENTAL STATUS? PT PREGNANT?
OLMC CONSULT TO DISCUSS HYPERBARIC OXYGEN THERAPY FOR GCS ≤ 13 OR IF PREGNANT

EMT OR HIGHER LICENSE:
MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped)
ADULT: APPLY Bi/CPAP IF INDICATED (if equipped)

PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED
CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

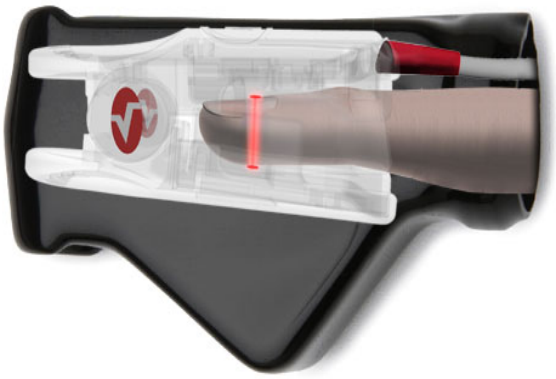
PROTOCOL 12C: Carbon Monoxide, cont.

%SpCO	Expected Signs & Symptoms
0-3%	None - Normal
4-9%	Minor Headache (**Normal for Smokers)
10-19%	Headache, Shortness of Breath
20-29%	Headache, Nausea, Dizziness, Fatigue
30-39%	Severe Headache, Vomiting, Vertigo, AMS
40-49%	AMS, Syncope, Tachycardia
50-59%	Seizures, Shock, Apnea, Coma
60% +	Coma, Death

Technique (Masimo RAD-57™ - see protocol Special Note):

Fingertip Sensor Placement Using Light Shield:

- Using the light shield with correct placement of finger is **VERY IMPORTANT** for accuracy of reading
- Clean and dry finger
- Orient equipment and finger to replicate diagram
- When possible, use ring finger, non-dominant hand (using the dominant hand of smokers has been shown to result in higher level readings that do not correlate with body-wide levels of CO)
- Insert finger until the tip of finger hits the stop block
- Sensor should NOT rotate or move freely on finger
- LED's (red light) should pass through mid-nail, not cuticle
- Connecting cable should be on top (nail side)



PROTOCOL 12C: Carbon Monoxide, cont.

<u>Startup Sequence</u>:

- Place sensor on finger (clean/dry skin)
- Press "POWER" button
- Verify all LED's light up and a 1 second tone is heard
- Startup mode begins
- All preset configurations are displayed
- Scrolling zeroes 0 – 0 – 0 and flashes dashed lines
- May take up to 25 seconds
- Do not move sensor during startup
- When complete, reading is displayed
- Begin patient monitoring
- Defaults to pulse rate and oxygen saturation reading
- "PI" bar graph displays strength of arterial perfusion

Power Button. Press "ON", Hold for "OFF"

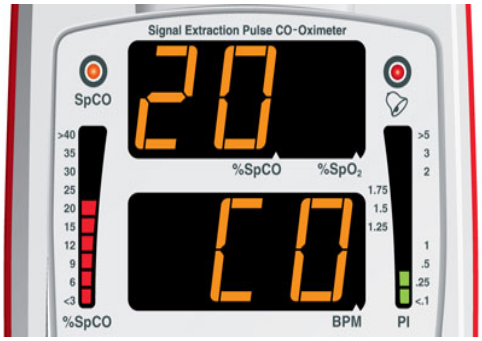
Each green LED window below Power Button that illuminates indicates 25% battery power

<u>Operation / Pulse Oximetry & Pulse Rate:</u>

- Displays after startup sequence described above
- Oxygen Saturation on top in red numbers
- Pulse Rate on bottom in green numbers
- Low Signal I.Q.® (SIQ) LED lit indicates poor pulse ox signal quality - evaluate finger/sensor, use alternate finger
- Press "DISPLAY" to display %spCO
- Press "Bell" to silence alarms (if needed)

PROTOCOL 12C: Carbon Monoxide, cont.

Operation / Carbon Monoxide (Carboxyhemoglobin) Measurement:



- Press "DISPLAY" button as described above to toggle display to show %SpCO reading (to toggle back to pulse oximetry and pulse rate mode, press "DISPLAY" again)
- Carboxyhemoglobin displayed in % on top in numbers
- "CO" displayed on bottom confirming mode
- Real-time SpCO indicator continuously reads SpCO
- Confirm abnormal readings by taking several measurements on different fingers and average the readings

Operation / Troubleshooting:

Error Messages:
- "NO Cbl" = cable not seated properly into device or defective cable
- "SEN OFF" = sensor off finger or misaligned
- "bAd CbL" = defective cable (cable most likely needs replaced)
- "CbL" = incompatible cable (change to appropriate cable)
- "bAd SEN" = defective sensor (sensor most likely needs replaced)
- "SEN" = unrecognized sensor (change to appropriate sensor)
- "Err" = return for service

Will not power on = check battery compartment and replace batteries
Continuously in startup mode (Scrolling zeroes 0 – 0 – 0 and flashes dashed lines) = shield sensor from flashing lights, strobes or high ambient light with Light Shield (best accurate practice is to always use the Light Shield); try another finger

Using Physio-Control LifePak® 15 with Masimo sensing to measure %SpCO (see protocol Special Note):

- Power on, connect pulse oximetry cable to monitor/defibrillator and sensor, place sensor on patient
- To display %SpCO, use the SPEED DIAL to select the pulse oximetry display area
- Select PARAMETER from menu
- Select SpCO. Selected value displays for 10 seconds. If %SpCO is elevated, an advisory event occurs and elevated value flashes and alarm tone sounds

Special Note:

This protocol utilizes the Masimo RAD-57™ and discussion if using the Physio-Control LifePak® 15 to illustrate two methods of non-invasively measuring circulating levels of carbon monoxide (%SpCO). The Oklahoma State Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not exclusively endorse either the Masimo RAD-57™ or the Physio-Control LifePak® 15 for non-invasively measuring circulating levels of carbon monoxide (%SpCO) by EMS professionals. Check with your EMS system's medical oversight physician(s) for specific protocol directions on equipment to be used in for non-invasively measuring circulating levels of carbon monoxide (%SpCO) if not using either the Masimo RAD-57™ or the Physio-Control LifePak® 15.

Medical Literature References
12C – Carbon Monoxide - Adult & Pediatric

1. Touger M, Birnbaum A, Wang J, Chou K, Pearson D, Bijur P.Performance of the RAD-57 pulse CO-oximeter compared with standard laboratory carboxyhemoglobin measurement.Ann Emerg Med. 2010 Oct;56(4):382-8.
2. Cone DC, MacMillan D, Parwani V, Van Gelder C.Threats to life in residential structure fires.PrehospEmerg Care. 2008 Jul-Sep;12(3):297-301.
3. Wolf SJ, Lavonas EJ, Sloan EP, Jagoda AS; American College of Emergency Physicians.Clinical policy: Critical issues in the management of adult patients presenting to the emergency department with acute carbon monoxide poisoning.Ann Emerg Med. 2008 Feb;51(2):138-52.
4. Silver S, Smith C, Worster A; BEEM (Best Evidence in Emergency Medicine) Team.Should hyperbaric oxygen be used for carbon monoxide poisoning?CJEM. 2006 Jan;8(1):43-6.
5. Kao LW, Nañagas KA.Toxicity associated with carbon monoxide.Clin Lab Med. 2006 Mar;26(1):99-125.
6. Kao LW, Nañagas KA.Carbon monoxide poisoning.Med Clin North Am. 2005 Nov;89(6):1161-94.
7. Gilmer B, Kilkenny J, Tomaszewski C, Watts JA.Hyperbaric oxygen does not prevent neurologic sequelae after carbon monoxide poisoning.AcadEmerg Med. 2002 Jan;9(1):1-8.

12D – HYPERBARIC OXYGEN THERAPY CONSIDERATIONS ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Indications:

Carbon monoxide (CO) toxicity (as determined through Protocol 12C – Carbon Monoxide).

Contraindications:

Absence of carbon monoxide toxicity.

Clinical Pearls:

1. In the care of the suspected CO poisoned patient, exercise personal safety and avoid becoming CO poisoned.

2. The hallmarks of effective EMS care of the suspected CO poisoned patient include removal of the patient from the CO source and oxygenation with near 100% oxygen (via high flow through non-rebreather mask with good seal, non-invasive positive pressure ventilation, or through bag-valve-mask or bag-valve-artificial airway connected to an oxygen reservoir).

3. The vast majority (nearly all) of suspected CO poisoned patients may be appropriately transported to an emergency department that does not have direct access to hyperbaric oxygen (HBO) therapy.

4. Contact the nearest HBO capable facility's on-line medical control for EMS to discuss the advisability of transport for HBO therapy consideration if either of the following distinct clinical situations in which suspected/measured CO toxicity is the primary medical issue of concern:
    a. Glasgow Coma Scale score ≤ 13
    b. Pregnancy

5. Consultation and/or transport to a HBO-capable facility does not compel use of HBO therapy by the medical staff at that facility.

6. In Oklahoma, emergency facilities with direct access to HBO therapy (at least part-time) include:
    a. Oklahoma City – Integris Baptist Medical Center
    b. Tulsa – OSU Medical Center

Medical Literature References
12D– Hyperbaric Oxygen Therapy Considerations - Adult & Pediatric

1. Touger M, Birnbaum A, Wang J, Chou K, Pearson D, Bijur P.Performance of the RAD-57 pulse CO-oximeter compared with standard laboratory carboxyhemoglobin measurement.Ann Emerg Med. 2010 Oct;56(4):382-8.
2. Cone DC, MacMillan D, Parwani V, Van Gelder C.Threats to life in residential structure fires.PrehospEmerg Care. 2008 Jul-Sep;12(3):297-301.
3. Wolf SJ, Lavonas EJ, Sloan EP, Jagoda AS; American College of Emergency Physicians.Clinical policy: Critical issues in the management of adult patients presenting to the emergency department with acute carbon monoxide poisoning.Ann Emerg Med. 2008 Feb;51(2):138-52.
4. Silver S, Smith C, Worster A; BEEM (Best Evidence in Emergency Medicine) Team.Should hyperbaric oxygen be used for carbon monoxide poisoning?CJEM. 2006 Jan;8(1):43-6.
5. Kao LW, Nañagas KA.Toxicity associated with carbon monoxide.Clin Lab Med. 2006 Mar;26(1):99-125.
6. Kao LW, Nañagas KA.Carbon monoxide poisoning.Med Clin North Am. 2005 Nov;89(6):1161-94.
7. Gilmer B, Kilkenny J, Tomaszewski C, Watts JA.Hyperbaric oxygen does not prevent neurologic sequelae after carbon monoxide poisoning.AcadEmerg Med. 2002 Jan;9(1):1-8.

12E – CYANIDE
ADULT & PEDIATRIC

TREATMENT PRIORITIES

1. Personal safety
2. Patient safety
3. Cardiac arrest resuscitation (if applicable)
4. Oxygenation/Ventilation
5. Hydroxocobalamin administration
   - Enclosed space?
   - Soot in mouth/nose?
   - Altered mental status?

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

DIRECT TO MOVE AWAY FROM SUSPECTED SOURCE
IF SAFE TO DO SO
CPR BY EMD INSTRUCTION (if applicable)
IF AWAKE, AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).

EMR / EMT

MAINTAIN PERSONAL & PATIENT SAFETY
RESUSCITATION PER SECTION 4 (CARDIAC ARREST) PROTOCOLS (if applicable)
GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 HIGH LITER PER MINUTE FLOW (15 LPM +) VIA NRB, OR BVM AS APPROPRIATE
APPLY CARDIAC MONITOR (if equipped)

EMT OR HIGHER LICENSE:
MEASURE END-TIDAL CO_2 & MONITOR WAVEFORM CAPNOGRAPHY (if equipped)
ADULT: APPLY Bi/CPAP IF INDICATED (if equipped)

PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

EMT-I85 / AEMT

ADULT: INTUBATE IF INDICATED

IV/IO ACCESS – START TWO LINES
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ADULT: HYDROXOCOBALAMIN 5 grams IVPB IN 15 MINS – ADMINISTER WITHOUT DELAY
FOR HYDROXOCOBALAMIN, USE SEPARATE LINE FROM ALL OTHER MEDICATIONS
PEDIATRIC: CONSULT OLMC FOR DIRECTIVES ON HYDROXOCOBALAMIN ADMINISTRATION (RECOMMENDED DOSE AT 70 mg/kg IVPB)

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED
CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
12E– Cyanide - Adult & Pediatric

1. O'Brien DJ, Walsh DW, Terriff CM, Hall AH.Empiric management of cyanide toxicity associated with smoke inhalation.Prehosp Disaster Med. 2011 Oct;26(5):374-82.
2. Cone DC, MacMillan D, Parwani V, Van Gelder C.Threats to life in residential structure fires.PrehospEmerg Care. 2008 Jul-Sep;12(3):297-301.
3. Borron SW, Baud FJ, Barriot P, Imbert M, Bismuth C.Prospective study of hydroxocobalamin for acute cyanide poisoning in smoke inhalation.Ann Emerg Med. 2007 Jun;49(6):794-801, 801.e1-2.
4. Hall AH, Dart R, Bogdan G.Sodium thiosulfate or hydroxocobalamin for the empiric treatment of cyanide poisoning?Ann Emerg Med. 2007 Jun;49(6):806-13.
5. Eckstein M, Maniscalco PM.Focus on smoke inhalation--the most common cause of acute cyanide poisoning.Prehosp Disaster Med. 2006 Mar-Apr;21(2):s49-55.
6. Guidotti T.Acute cyanide poisoning in prehospital care: new challenges, new tools for intervention.Prehosp Disaster Med. 2006 Mar-Apr;21(2):s40-8.
7. Kuo DC, Jerrard DA.Environmental insults: smoke inhalation, submersion, diving, and high altitude.Emerg Med Clin North Am. 2003 May;21(2):475-97, x.

SECTION 13

OBSTETRIC/GYNECOLOGIC

13A – CHILDBIRTH - ROUTINE

TREATMENT PRIORITIES

1. Supportive Care
2. Vital signs
3. Transport left lat recumbent if prior to delivery
4. OLMCP consultation for cases of complicated delivery:
   - Cord prolapse
   - Limb presentation
   - Breech delivery
   - Neonatal resuscitation
5. Transport directly to labor and delivery if directed/usual hospital destination practice
6. Post Delivery Infant Care
   - Stimulate/dry/perform oral nasal suctioning
   - Prevent hypothermia
   - O2 administration

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

ADVISE TO NOT TRY TO PREVENT THE BIRTH
ADVISE NOT TO SIT ON TOILET
PATIENT TO ASSUME POSITION OF COMFORT
ADVISE PATIENT TAKE DEEP BREATHS BETWEEN CONTRACTIONS

EMR / EMT

GENERAL SUPPORTIVE CARE

CEPHALIC (HEAD FIRST) PRESENTATION:
POSITION MOTHER SUPINE/KNEES WIDELY SEPARATED/ BUTTOCKS ELEVATED W/PILLOW/BLANKET
PLACE STERILE PAD/SHEET UNDER AND AROUND VAGINA

PLACE ONE HAND OVER FETAL HEAD
APPLY MINIMAL STABILIZING PRESSURE TO PREVENT EXPLOSIVE BIRTH

SUCTION MOUTH THEN EACH NOSTRIL WITH BULB SYRINGE IF NEEDED TO CLEAR AIRWAY

ALLOW HEAD TO ROTATE NATURALLY
DELIVER THE REST OF INFANT – MAY REQUIRE GENTLE DOWNWARD PRESSURE ON ANTERIOR (UPPER SHOULDER & GENTLE UPWARD PRESSURE ON POSTERIOR (LOWER) SHOULDER FOR EASIER DELIVERY

CLAMP/CUT UMBILICAL CORD
ASSESS INFANT/CALCULATE APGAR SCORE AT ONE AND FIVE MINUTES POST DELIVERY USING TABLE

EMT-I85 / AEMT

IV ACCESS
IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

APGAR SCORING (SIGN)	0	1	2
APPEARANCE	BLUE OR PALE	BODY PINK, EXTREMITIES BLUE	COMPLETELY PINK
HEART RATE (BPM)	ABSENT	≤100	>100
GRIMACE (REACTION TO CATHETER IN NARES)	NO RESPONSE	GRIMACE	COUGH OR SNEEZE
MUSCLE TONE	LIMP	SOME FLEXION	ACTIVE MOTION
RESPIRATORY RATE	ABSENT	SLOW/IRREGULAR	GOOD, CRYING

Medical Literature References
13A – Childbirth - Routine

1. Greenwald IB, Keady MT. Obstetric and Gynecologic Emergencies. In: Cone DC, O'Connor RE, Fowler RL, eds. Emergency Medical Services: Clinical Practice and Systems Oversight. Clinical Aspects of Prehospital Medicine. Dubuque, IA: Kendall Hunt Professional; 2009: 298-304.
2. Verdile VP, Tutsock G, Paris PM, Kennedy RA. Out-of-hospital deliveries: a five-year experience. Prehosp Disaster Med. 1995 Jan-Mar;10(1):10-3.

13B – CHILDBIRTH - COMPLICATED

TREATMENT PRIORITIES

1. Supportive Care
2. Vital signs
3. Transport left lat recumbent if prior to delivery
4. OLMC consultation for cases of complicated delivery:
   - Cord prolapse
   - Limb presentation
   - Breech delivery
   - Neonatal resuscitation
5. Transport directly to labor and delivery if directed/usual hospital destination practice
6. Post Delivery Infant Care
   - Stimulate/dry/perform oral nasal suctioning
   - Prevent hypothermia
   - O2 administration

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

EMD

ADVISE TO NOT TRY TO PREVENT THE BIRTH
ADVISE NOT TO SIT ON TOILET
PATIENT TO ASSUME POSITION OF COMFORT
ADVISE PATIENT TAKE DEEP BREATHS BETWEEN CONTRACTIONS

EMR / EMT

GENERAL SUPPORTIVE CARE

CORD PROLAPSE:
PLACE MOTHER IN TRENDELENBERG POSITION
ELEVATE BUTTOCKS TO RELIEVE PRESSURE ON CORD
PLACE GLOVED HAND INTO VAGINA PUSHING UP ON HEAD TO RELIEVE COMPRESSION ON CORD
MAINTAIN POSITION UNTIL RELIEVED BY ANOTHER HEALTH PROFESSIONAL OR DELIVERY OCCURS

BREECH OR LIMB PRESENTATION:
PLACE MOTHER IN TRENDELENBERG POSITION
IMMEDIATE PRIORITY I TRANSPORT
EARLY HOSPITAL NOTIFICATION

CEPHALIC (HEAD FIRST) PRESENTATION:
POSITION MOTHER SUPINE/KNEES WIDELY SEPARATED/ BUTTOCKS ELEVATED W/PILLOW/BLANKET
PLACE STERILE PAD/SHEET UNDER AND AROUND VAGINA

PLACE ONE HAND OVER FETAL HEAD
APPLY MINIMAL STABILIZING PRESSURE TO PREVENT EXPLOSIVE BIRTH

AS HEAD DELIVERED CHECK FOR **NUCHAL CORD** WRAPPED AROUND FETAL NECK – IF PRESENT, SLIP CORD EITHER OVER HEAD OR DOWN OVER SHOULDER OR CLAMP/CUT

SUCTION MOUTH THEN EACH NOSTRIL WITH BULB SYRINGE IF NEEDED TO CLEAR AIRWAY

ALLOW HEAD TO ROTATE NATURALLY
DELIVER THE REST OF INFANT – MAY REQUIRE GENTLE DOWNWARD PRESSURE ON ANTERIOR (UPPER SHOULDER & GENTLE UPWARD PRESSURE ON POSTERIOR (LOWER) SHOULDER FOR EASIER DELIVERY

CLAMP/CUT UMBILICAL CORD
ASSESS INFANT/CALCULATE APGAR SCORE AT ONE AND FIVE MINUTES POST DELIVERY USING TABLE

EXCESSIVE POSTPARTUM BLEEDING – MASSAGE UTERUS

EMT-I85 / AEMT

IV ACCESS
IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS IF NO SIGNS OF PULMONARY EDEMA,
REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ECLAMPSIA: MAGNESIUM SULFATE 1 gram IVP/IOP
MAY REPEAT EVERY 2-3 MINUTES UNTIL SEIZURE ABATES
MAXIMUM CUMULATIVE DOSE IS 4 grams
CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

APGAR SCORING (SIGN)	0	1	2
APPEARANCE	BLUE OR PALE	BODY PINK, EXTREMITIES BLUE	COMPLETELY PINK
HEART RATE (BPM)	ABSENT	≤100	>100
GRIMACE (REACTION TO CATHETER IN NARES)	NO RESPONSE	GRIMACE	COUGH OR SNEEZE
MUSCLE TONE	LIMP	SOME FLEXION	ACTIVE MOTION
RESPIRATORY RATE	ABSENT	SLOW/IRREGULAR	GOOD, CRYING

Medical Literature References
13B – Childbirth - Complicated

1. Greenwald IB, Keady MT. Obstetric and Gynecologic Emergencies. In: Cone DC, O'Connor RE, Fowler RL, eds. Emergency Medical Services: Clinical Practice and Systems Oversight. Clinical Aspects of Prehospital Medicine. Dubuque, IA: Kendall Hunt Professional; 2009: 298-304.
2. Verdile VP, Tutsock G, Paris PM, Kennedy RA. Out-of-hospital deliveries: a five-year experience. Prehosp Disaster Med. 1995 Jan-Mar;10(1):10-3.

13C – VAGINAL BLEEDING/DISCHARGE ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES
1. Supportive care
2. IVF if needed for hypotension

EMD

ADVISE TO REST IN COMFORTABLE POSITION
ADVISE NO FOOD OR DRINK
ADVISE TO AVOID MOVEMENT UNLESS NECESSARY

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O2 VIA NC OR NRB, AS APPROPRIATE

EXTERNAL GENITALIA EXAM ONLY IF ONGOING, ACTIVE BLLEDING WITH CONCERNS OF HEMODYNAMIC INSTABILITY

PLACE ABD PAD/VAGINAL PAD AS NEEDED

REPORT ANY CONCERNS/SUSPICIONS OF SEXUAL ASSAULT TO RECEIVING NURSE/PRACTITIONER/PHYSICIAN

EMT-I85 / AEMT

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS IF NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg IF NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
13C – Vaginal Bleeding/Discharge – Adult & Pediatric

1. Schmitz G, Tibbles C.Genitourinary emergencies in the nonpregnant woman. Emerg Med Clin North Am. 2011 Aug;29(3):621-35.
2. Greenwald IB, Keady MT. Obstetric and Gynecologic Emergencies. In: Cone DC, O'Connor RE, Fowler RL, eds. Emergency Medical Services: Clinical Practice and Systems Oversight. Clinical Aspects of Prehospital Medicine. Dubuque, IA: Kendall Hunt Professional; 2009: 298-304.
3. Daniels RV, McCuskey C. Abnormal vaginal bleeding in the nonpregnant patient.Emerg Med Clin North Am. 2003 Aug;21(3):751-72.

13D – COMPLICATIONS OF PREGNANCY ADULT

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES

1. Vital Signs
2. Dextrose for hypoglycemia
3. Do NOT treat asymptomatic HTN.
4. Do NOT reduce symptomatic HTN more than 10%.
5. Magnesium for eclampsia

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O_2 VIA NC or NRB AS INDICATED
APPLY CARDIAC MONITOR/OBTAIN 12-LEAD ECG (if equipped)
TRANSMIT 12-LEAD ECG TO RECEIVING EMERGENCY DEPARTMENT

DETERMINE BLOOD GLUCOSE
HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL, 1tube ORAL GLUCOSE (15g) PO

EMT-I85 / AEMT

IV ACCESS
HYPOGLYCEMIA CARE:
IF GLUCOSE <50 mg/dL, D50 1 mL/kg IVP UP TO 50 mL
GLUCAGON 1 mg IM IF NO VASCULAR ACCESS OBTAINED

PARAMEDIC

ECLAMPSIA: MAGNESIUM SULFATE 1 gram IVP/IOP
MAY REPEAT EVERY 2-3 MINUTES UNTIL SEIZURE ABATES
MAXIMUM CUMULATIVE DOSE IS 4 grams

DO NOT TREAT ASYMPTOMATIC HYPERTENSION.
DO NOT TREAT HYPERTENSION IN SUSPECTED ACUTE STROKE.
ADULT: IF BP >240 mmHg SYSTOLIC AND/OR >120 mmHg DIASTOLIC **AND**
WITH SYMPTOMS OF CHEST PAIN OR RESPIRATORY DISTRESS,

HYDRALAZINE 10 mg SLOW IVP
MAY REPEAT AT 10 mg EVERY 30 MINS, MAX CUMULATIVE DOSE OF 30 mg **OR**
LABETALOL 20 mg SLOW IVP (unless contraindicated).
MAY REPEAT AT 40 mg EVERY 10 MINS, MAX CUMULATIVE DOSE OF 300 mg **OR**
NITROGLYCERIN 0.4 mg SL, MAY REPEAT EVERY 5 MINS
(INTRAVENOUS OR TRANSDERMAL NITROGLYCERIN OPTIONS PER PROTOCOL 16F)
DO NOT REDUCE BP BEYOND 10%.

Medical Literature References
13D – Complications of Pregnancy – Adult

1. Marik PE, Rivera R. Hypertensive emergencies: an update. CurrOpinCrit Care. 2011 Dec;17(6):569-80.
2. Baumann BM, Cline DM, Pimenta E. Treatment of hypertension in the emergency department. J Am SocHypertens. 2011 Sep-Oct;5(5):366-77.
3. Greenwald IB, Keady MT. Obstetric and Gynecologic Emergencies. In: Cone DC, O'Connor RE, Fowler RL, eds. Emergency Medical Services: Clinical Practice and Systems Oversight. Clinical Aspects of Prehospital Medicine. Dubuque, IA: Kendall Hunt Professional; 2009: 298-304.
4. Mateos Rodriguez AA, Benito Vellisca MA. Management of eclampsia in the prehospital setting. Emerg Med J. 2007 Jul;24(7):504.

13E – PELVIC PAIN ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES
1. Supportive care
2. IVF if needed for hypotension

EMD

ADVISE TO REST IN COMFORTABLE POSITION
ADVISE NO FOOD OR DRINK
ADVISE TO AVOID MOVEMENT UNLESS NECESSARY

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O2 VIA NC OR NRB, AS APPROPRIATE

REPORT ANY CONCERNS/SUSPICIONS OF SEXUAL ASSAULT
TO RECEIVING NURSE/PRACTITIONER/PHYSICIAN

EMT-I85 / AEMT

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 ml BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

ANTIEMETIC (IF REQUIRED)
ADULT: ONDANSETRON 4 mg IVP/ODT. MAY REPEAT ONCE IN 10 MINUTES

PEDIATRIC: ONDANSETRON 0.1 mg/kg IVP TO A MAXIMUM SINGLE DOSE OF 4 mg
IF AGE >2 years, MAY GIVE ONDANSETRON 4 mg ODT

ANALGESIA (IF REQUIRED)
FOR OPIATE USE, ADULT MUST HAVE SYS BP ≥ 100 mmHg; PEDIATRIC MUST HAVE SYS BP ≥ (70 + 2x age in years) mmHg

ADULT: FENTANYL 1 mcg/kg SLOW IVP/IM/IN, MAXIMUM DOSE 100 mcg. MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 3 mcg/kg or 250 mcg WHICHEVER IS LESSER.
OR
ADULT: MORPHINE SULFATE 2 - 4 mg SLOW IVP, MAY REPEAT 2 - 4 mg EVERY 5 MINUTES TO A TOTAL OF 10 mg.
OR
ADULT: HYDROMORPHONE 0.5 - 1 mg SLOW IVP .
MAY REPEAT EVERY 10 MINUTES TO MAXIMUM CUMULATIVE DOSE OF 2 mg.

PEDIATRIC: OLMCP ORDER ONLY

OLMCP CONSULT IF FURTHER ANALGESIA REQUIRED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL

Medical Literature References
13E – Pelvic Pain – Adult& Pediatric

1. Schmitz G, Tibbles C.Genitourinary emergencies in the nonpregnant woman. Emerg Med Clin North Am. 2011 Aug;29(3):621-35.
2. Greenwald IB, Keady MT. Obstetric and Gynecologic Emergencies. In: Cone DC, O'Connor RE, Fowler RL, eds. Emergency Medical Services: Clinical Practice and Systems Oversight. Clinical Aspects of Prehospital Medicine. Dubuque, IA: Kendall Hunt Professional; 2009: 298-304.

13F – SEXUAL ASSAULT ADULT & PEDIATRIC

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

TREATMENT PRIORITIES
1. Supportive care – physical/emotional
2. IVF if needed for hypotension
3. Sexual assault exam capable destination

EMD

ADVISE TO REST IN COMFORTABLE POSITION
ADVISE NO FOOD OR DRINK
ADVISE TO AVOID MOVEMENT UNLESS NECESSARY

EMR / EMT

GENERAL SUPPORTIVE CARE
OBTAIN VITAL SIGNS
O2 VIA NC OR NRB, AS APPROPRIATE

INSTRUCT PATIENT NOT TO CHANGE CLOTHING OR URINATE/DEFECATE

WHEN TRANSPORTING, PREFERENCE TO UTILIZE TREATING PROFESSIONAL SAME GENDER AS PATIENT

REPORT ANY CONCERNS/SUSPICIONS OF SEXUAL ASSAULT TO RECEIVING NURSE/PRACTITIONER/PHYSICIAN

EMT-I85 / AEMT

IV ACCESS
ADULT: IV NS TKO IF SYS BP ≥ 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS
ADULT: IV NS 250 mL BOLUS IF SYS BP <100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,
ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS < 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA
PEDIATRIC: IV NS TKO IF SYS BP ≥ (70 + 2x age in years) mmHg
PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP < (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA

PARAMEDIC

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)
TRANSPORT ASAP PER DESTINATION PROTOCOL - EMPHASIS ON FACILITY THAT PERFORMS SEXUAL ASSAULT EXAMS

Medical Literature References
13F – Sexual Assault – Adult& Pediatric

1. Linden JA. Clinical practice. Care of the adult patient after sexual assault. N Engl J Med. 2011 Sep 1;365(9):834-41.
2. Greenwald IB, Keady MT. Obstetric and Gynecologic Emergencies. In: Cone DC, O'Connor RE, Fowler RL, eds. Emergency Medical Services: Clinical Practice and Systems Oversight. Clinical Aspects of Prehospital Medicine. Dubuque, IA: Kendall Hunt Professional; 2009: 298-304.
3. DeVore HK, Sachs CJ. Sexual assault. Emerg Med Clin North Am. 2011 Aug;29(3):605-20.

SECTION 14

RESPONSE, SCENE ISSUES & PATIENT TRANSPORTATION

14A – STAGING CONSIDERATIONS

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

The Oklahoma State Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division firmly support all appropriate operations designed to protect public safety professionals (law enforcement, fire, and EMS) from physical assault in the course of fulfilling their respective duties. While the vast majority of the State of Oklahoma 2013 EMS Protocols focus upon patient care and beneficence, it is never their intent that public safety professionals purposefully compromise their personal safety in the commission of these protocols.

Enroute to a scene of threatened, alleged, or actual violence, non-law enforcement/tactical fire and EMS professionals are to stage an appropriately safe distance away and not to proceed to the patient(s) until the scene is declared safe by appropriate law enforcement professionals. In the event of structural fire, non-fire EMS professionals are to stage at a perimeter assigned by appropriate fire suppression professionals and to take further access as directed by fire suppression professionals when hazards are appropriately mitigated. In all cases involving staging pending hazard mitigation, dispatch should be notified when the scene has been declared safe to ensure timely information transmission to the assigned field professionals. Further specific details related to any hazard staging communication procedure should be the responsibility of centralized communications for each responding agency.

General Principles Regarding Threatened or Alleged Violent Scenes:

A. While enroute to a scene where violence might be involved, check to see whether law enforcement officer(s) are also enroute to the scene. Responding EMS professionals should be advised by dispatch to stage when a known violent incident has not been declared safe for EMS entry by appropriate law enforcement professionals.
B. While still an anticipated safe distance from the reported incident location, turn off all emergency warning devices if being used (emergency lights and sirens).
C. Avoid crossing the line of sight of the reported incident address while responding and park out of sight of the address when staging.

PROTOCOL 14A: Staging Considerations, cont.

D. Advise dispatch of the staging location (exact address if known). If on the first arriving unit, advise dispatch of an anticipated safe approach route to the area for all other incoming emergency responders.

E. Anytime encountering a previously unidentified scene of threatened or alleged violence, rapidly promote personal safety and the safety of fellow emergency professionals. Advise dispatch for law enforcement assistance (emergency response/assistance if violence is ongoing). Withdraw to a position of safety until the scene can be appropriately secured by appropriate law enforcement. If the alleged assailant is reported to have left the scene and patient injuries are critical, utilize best judgment in whether to attempt rapid extrication and transport of casualties. Again, the Oklahoma State Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not expect purposeful compromise of an EMS professional's personal safety in the commission of patient care at scenes of threatened, alleged, or actual violence.

Medical Literature References
14A – Staging Considerations

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14B – ACTIONS TO PRESERVE CRIME SCENES

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

This protocol has been developed to promote proper emphasis on patient care while simultaneously promoting law enforcement ability to conduct effective and thorough crime scene investigation.

A. Only assigned EMS units should respond. Excess numbers of EMS professionals on scene may lead to inadvertent evidence destruction.
B. When approaching a crime scene protected by law enforcement, EMS professionals should request entry into the area to determine life status of the individual. The highest licensed EMS professional (eg. Paramedic if on scene) is to enter in cases of probable irreversible death to minimize scene disturbance.
C. If law enforcement professionals refuse EMS access into the crime scene, do not become confrontational. Follow applicable operational procedures in consulting with an appropriate Supervisor.
D. Refer to Protocol 4K -"Do Not Resuscitate"/Advanced Directive Orders, Futility of Resuscitation Initiation & Termination of Resuscitation – Adult & Pediatric for information regarding when to withhold resuscitation.
E. To obtain an ECG tracing when the probable irreversibly dead patient is prone:

(If using a 4-lead cable) place the left arm electrode on the left arm or upper left back. Place the right arm electrode on the right arm or upper right back. Place the left leg electrode on the lower portion of the left back or on the left leg. Place the right leg electrode on the lower portion of the right back or on the right leg. Alternatively, use monitoring/defibrillation pads. Place the sternum electrode on the upper right back and the apex electrode on the lower left back.

PROTOCOL 14B: Actions to Preserve Crime Scenes, cont.

F. If the patient has signs of life, aggressive resuscitative efforts should be initiated. During scene resuscitation:

1. Keep EMS professionals and medical equipment close to the victim.
2. Keep out of any blood that has pooled.
3. Minimize destruction of the patient's clothing. If the patient's clothing has a puncture, do not use the hole to start cutting and do not cut “through” the hole.

G. In crime victim resuscitation, work to move the victim to the ambulance expeditiously.

H. If the patient relates any information relating to the crime, report this information to the appropriate law enforcement professionals.

Special Notes:

1. **DO NOT** go through the victim's personal effects (if the victim has expired).
2. **DO NOT** cover the body with a sheet or other material (if the victim has expired).
3. **DO NOT** move or handle any object at the scene unless absolutely essential for life-saving medical care. Inform law enforcement professionals of any such movement or handling, preferably before doing so.
4. **DO NOT** take any object from the scene unless absolutely essential for life-saving medical care (eg. impaled object).
5. **DO NOT** clean the body of blood, etc. (if the victim has expired)
6. **DO NOT** wander around the crime scene; return to the emergency vehicle.
7. **DO NOT** litter the crime scene with medical equipment, dressings, bandages, etc.

Medical Literature References
14B – Actions to Preserve Crime Scenes

1. Sharma BR.Clinical forensic medicine--management of crime victims from trauma to trial.J Clin Forensic Med. 2003 Dec;10(4):267-73.
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14C – OTHER HEALTH PROFESSIONALS ON SCENES

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Licensed EMS professionals must at all times act utilizing appropriate medical authority. Formats of appropriate medical authority include verbal physician medical orders, written physician medical orders, and standing orders in the form of the State of Oklahoma 2013 EMS Protocols. Licensed EMS professionals are authorized to accept medical directives from the following:

1. EMS System Medical Director.
2. Principles of accepted standard of care practice by EMS professionals, as defined by the State of Oklahoma 2013 EMS Protocols.
3. Verbal order from an On-Line Medical Control Physician (OLMCP) or approved designate (OLMC).
4. Verbal or written order signed by a physician (M.D. or D.O.) present with the patient in the medical office, clinic, or specialized treatment facility (eg. dialysis center).
5. Bystander physician that presents a valid M.D. or D.O. Oklahoma License Card.
6. Oklahoma Poison Control Center Specialists acting under the standing orders of the Physician Medical Director of the Oklahoma Poison Control Center.

Compliance with Physician's Verbal or Written Orders:

1. Verbal or written orders that are signed by the physician are acceptable.
2. If a physician (M.D. or D.O.) directs an EMS professional to provide treatment that is not clearly defined in the State of Oklahoma 2013 EMS Protocols, that EMS professional may carry out the order to the best of his or her ability as long as the ordered treatment or procedure falls within his or her authorized scope of EMS practice.
3. If an EMS professional receives a physician order for care that he or she does not feel comfortable with, or feels the order does not represent the appropriate standard of care for the patient's assessed condition, he or she should advise the ordering physician of the State of Oklahoma 2013 EMS Protocols that he or she is required to uphold. Request to be allowed to continue further patient care under these standing orders. Should the ordering physician dissent to using these standing orders at that time, contact the appropriate OLMCP, brief the OLMCP on the situation, including

PROTOCOL 14C: Other Health Care Professionals on Scene, cont.

Compliance with Physician's Verbal or Written Orders, cont.:

the patient's assessed condition and the physician orders of concern and allow the physicians to directly discuss further treatment of the patient. At no time should critical patient care as specified in these standing medical orders be delayed while resolution of the situation is occurring.

4. Poison Control Center Specialists are authorized to direct medical care related to the medical toxicology and/or hazardous material exposure aspects of patient care if contacted for directives.

General Principles for Working with Physician(s) On-Scene

1. Conduct all conversations and operations with the standards of professional demeanor and respectful attitude.

2. Make every reasonable effort to carry out orders within appropriate standards of care given by on-scene physician(s).

3. If doubt exists as to whether the "physician" is indeed a validly licensed Oklahoma M.D. or D.O., ask to see the physician's registration card from the Oklahoma State Board of Medical Licensure and Supervision. If the physician cannot verify this status, EMS professionals are to proceed with managing the patient according to established protocol.

Medical Literature References
14C – Other Health Professionals on Scene

1. Barishansky RM, O'Connor KE, Perkins TJ."Is there a doctor in the house?" Addressing bystander physician involvement on scene.Emerg Med Serv. 2005 Jan;34(1):87-90.
2. Benitez FL, Pepe PE.Role of the physician in prehospital management of trauma: North American perspective.CurrOpinCrit Care. 2002 Dec;8(6):551-8.
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14D – INFORMED PATIENT CONSENT/REFUSAL

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

A. Competent adults are entitled to make decisions about their health care. They have the right to refuse medical care after they have been properly informed of the benefits, risks, and alternatives to the recommended care. This protocol defines the mechanisms by which a patient who summoned EMS care, or for whom EMS care was summoned, may refuse care and/or transport.

B. To safely allow a patient (or their legal representatives) to exercise their rights while protecting yourself and your organization, you need to follow the following steps – each and every time, with each patient who is ultimately not treated or transported:

1. Perform a complete assessment, maintaining suspicion of serious illness or injury.
2. Evaluate the differential of possible medical conditions. Avoid tunnel-vision on only one explanation for the patient's condition. Assume worst case possibilities. You should be thinking of "ruling in" rather than "trying to explain away" worrisome findings. These worst case possibilities must be communicated clearly to the patient (or their legal representatives).
3. Ascertain the patient's mental status. The patient must be alert and oriented to time, place, and events. You must determine the patient's ability to make an informed refusal, dependent upon their ability to evaluate choices, understand risks and benefits of those choices, and have the capacity to make rational decisions. Factors that could impede or impair comprehension and decision making capacity include clinical, physical, and emotional disturbances. If a patient's legal representative is making a refusal request, similar evaluation of that person's mental status must be accomplished.
4. The patient (or their legal representatives) must be offered transport in a polite and unqualified manner. Discouragement of EMS transport, intentional or not, may represent a breach of duty.

PROTOCOL 14D: Informed Patient Consent/Refusal, cont.

C. For the purpose of this protocol, legal representatives of patients (by legal custody or Durable Power of Attorney for Health Care), or parents of minor patients may refuse medical care if they:

1. Have capacity to make medical decisions = able to understand the nature of the potential injury or illness and the consequences of refusing medical care and/or transportation to an emergency department.

AND

2. At least one of the following:
   - Adult = 18 years of age or older.
   - An emancipated minor = <18 years of age, but living away from parents or guardians and financially responsible for self.
   - Married minor.
   - Minor in the military.

Pregnant minors must still have adult consent (unless the emergency medical care being requested or refused is directly related to the pregnancy) if they do not meet one of the above minor exceptions.

D. At no time may a spouse or relative who is not the legal representative of the patient make a decision to refuse evaluation, treatment, or transportation of the patient.

E. The following patients are considered **NOT** to have capacity to make medical decisions:

1. Altered level of consciousness, including, but not limited to alcohol/drug use or head injury.

2. Attempted or threatened suicide (verbally or otherwise) recently and related to the call.

3. Suspected cerebral hypoxia due to, but not limited to, head injury or prolonged seizure(s).

4. Adults with sustained severely altered vital signs (pulse >120 or <40; respirations >30or <8 per min; pulse oximetry <85% if history of chronic respiratory illness or <90% if previously healthy; systolic BP >220mmHg or <90mmHg).

PROTOCOL 14D: Informed Patient Consent/Refusal, cont.

5. Children with sustained severely altered vital signs (pulse >160 or <40; respirations >45 or <12 per min; pulse oximetry <90%; systolic BP >140 mmHg or < 70 + 2 x years of age).

6. Hypoglycemia defined as blood glucose <50 mg/dL.

7. Making largely irrational decisions in the presence of an obvious life or limb threatening condition (e.g. near amputation, ST elevation acute myocardial infarction), including persons who are emotionally unstable.

8. Under mental hold (Emergency Detention) which has been invoked by a person authorized to invoke such a hold.

9. Known mental retardation or deficiency to the degree of being unable to care for self without constant assistance or supervision.

F. An appropriate Supervisor or OLMC must be contacted for all incidents when:

1. EMS has been requested; AND
2. Patient contact has been established (occurs when EMS personnel are physically with the patient and inquire to the patient's well-being), the patient has evidence of acute medical condition (verbalized symptoms or physical exam findings)**,** but further EMS assessment, treatment, and/or transport has been refused; AND
3. Any one of the following:

    a) Patient does NOT have medical decision making capacity to refuse (see E 1-9 immediately above); **OR**
    b) Age < 2 years or > 65 years; **OR**
    c) Minors (unemancipated or not in military) without ability to contact parent/guardian; **OR**
    d) Communication barrier (language or handicap) to extent patient's understanding of condition and recommended treatment/transport cannot be verified; **OR**
    e) Refusal of further assessment, treatment, and/or transport in the EMS professional's judgment places the patient at significant risk.

PROTOCOL 14D: Informed Patient Consent/Refusal, cont.

G. After the EMS Supervisor and/or OLMC has been informed of the situation, the EMS Supervisor and/or OLMC should communicate directly with the patient, on a recorded line, to establish the patient's intent. To validate the refusal, the EMS Supervisor and/or OLMC should inform the patient or patient's legal representative of:

1. The patient's condition to the extent EMS assessment allows, specifically noting that EMS assessment is limited in scope and not a replacement for physician evaluation.
2. Given the apparent patient condition, the corresponding potential risks of refusal.
3. EMS will transport the patient to an appropriate emergency department for further assessment and care regardless of the financial status of the patient.
4. Alternate forms of treatment or transport that can be offered.
5. A clear statement that the patient (or patient's legal representative) is voluntarily assuming all health risks that may result from the refusal for care at this time.
6. A clear statement that EMS can be recalled anytime if medical assistance is desired.

H. If the EMS Supervisor and/or OLMC cannot successfully intervene to affect further assessment, treatment, and transport in an obvious life or limb threatening condition (e.g. near amputation, ST elevation acute myocardial infarction), AND on-scene personnel believe physically restraining the patient at this juncture to be unsafe or otherwise ill-advised, the EMS Supervisor and/or OLMC should consult the EMS System Medical Director or his/her designee for further consultative directives.

I. If a patient is determined to NOT have medical decision making capacity, the patient should be treated by implied consent. If this patient continues to refuse assessment, treatment, and/or transportation, all reasonable measures, including law enforcement assistance and/or appropriate use of physical restraint should be used to assess, treat, and transport the patient. The Oklahoma State Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division do not expect EMS professionals to place themselves in physical danger in this process. If a physical threat is imminent, withdraw to a position of safety, requesting additional appropriate resources, while attempting to leave the patient in the care of a responsible adult.

J. All patients (or their legal representatives) who are allowed to refuse further assessment, treatment, and/or transport must have the risks, benefits, and alternatives of their decisions explained to them by EMS personnel and demonstrate an understanding of this discussion. The reason(s) of refusal stated to EMS, benefits of recommended treatment and/or transport, alternatives to initially recommended care and/or transport, and risks of the refusal explained to the patient (or their legal representatives) and the reactions to this explanation must be documented in the patient care report in addition to the patient's chief complaint, vital signs and physical assessment.

K. All patients (or their legal representatives) who are allowed to refuse further assessment, treatment, and/or transport must be advised to seek further medical examination and care by a licensed physician (M.D. or D.O.). The limitations of EMS scope of assessment and practice must be explained. Document this information as it was explained.

PROTOCOL 14D: Informed Patient Consent/Refusal, cont.

L. All patients (or their legal representatives) who are allowed to refuse further assessment, treatment, and/or transport are to sign a refusal statement. A witness (preferably a friend or relative of the patient) is to countersign the refusal to verify its accuracy. The signature of release may or may not actually "release" an EMS professional or EMS organization from liability. One of the many purposes of using a release, however, is to further demonstrate good faith and diligence in meeting responsibilities to the patient. Together, with prudent actions, it helps to defend against assertions of abandonment. If the patient (or their legal representative) refuses to sign a valid refusal form, EMS professionals should also document the details of this encounter, including reasons for refusal to sign. EMS professionals should also document on the refusal form "Patient refused to sign." with at least one colleague signing as a witness.

M. Leave the patient (or their legal representatives) any applicable medical care instruction sheets. Document in the patient care report what instruction sheet(s) were given.

N. All dispatches not resulting in the transport of a patient require completion of the appropriate no transport information.

Additional Notes:

1. **DO NOT** ignore clues to potentially serious injuries or illnesses, such as abnormal vital signs, unconsciousness which may be followed by a transient lucid stage (head injury with epidural hematoma), concern of family members or witnesses, or inconsistencies in information obtained from different sources.

2. A red flag needs to be raised anytime with thoughts such as "this patient is just a drunk", "it's not that bad, this patient can't afford an ambulance", or "an ambulance shouldn't be tied up on this type of call". These rationalizations encourage underestimating the patient's condition and treatment shortcuts, resulting in substandard patient care and patient endangerment.

3. Refusal of assessment, treatment, and/or transport situations are often emotionally and potentially legally charged situations. Maintain duty to act in the best interests of all patients by avoiding any potentially discouraging tone, language, or body positioning that conveys unwillingness to provide humane, compassionate patient care.

4. Every patient has a right to EMS full service and attention. While a perception of "system demands" may be commendable, it cannot supersede a patient's needs and rights unless in the most dire of disaster conditions. Take patients one at a time and give them the best care morally, ethically, and legally possible.

PROTOCOL 14D: Informed Patient Consent/Refusal, cont.

Special Considerations in Care of Minors

A. If a minor aged patient presents with life or limb threatening condition, but no parent or guardian is present, do not delay indicated care. Provide treatment and transport per applicable protocol(s) and assign other public safety colleagues the task of notifying the child's parent/legal guardian of the incident, any obvious illness/injury, and hospital to which the child was transported.

B. If a minor needs medical treatment, but no parent or guardian is present, EMS professionals may treat per applicable protocol(s) if the parent or guardian cannot be reached after reasonable attempts and the minor gives verbal and physical consent.

C. IF THE PARENT/GUARDIAN CANNOT BE REACHED AFTER REASONABLE ATTEMPTS AND THE MINOR REFUSES TREATMENT:

1. Consult an appropriate EMS Supervisor for advice, which may include, but is not limited to:

   - Police assistance, taking the minor into their protective custody.
   - Utilization of family members outside the immediate parents/legal guardians.
   - Utilization of reliable adults with prior knowledge of the minor
   - As a last resort, allowing the minor refusal of service under the same requirements and procedures as listed above for adult patients (or their legal representatives).

Medical Literature References
14D – Informed Patient Consent Refusal

Medical References:

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4. National Assoc of EMS Physicians/American College of Emergency Physicians. Patient Non-transport. Joint Position Paper.PrehospEmerg Care. 2001;5:288. Reaffirmed by NAEMSP 1/07.
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14E – ON-LINE MEDICAL CONTROL PHYSICIANS

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

The Oklahoma State Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division support EMS professionals in the field having the availability of On-Line Medical Control Physicians (OLMCP). The OLMCP represents the Medical Director in “real-time” system operations.

The OLMCP is the resource available 24 hours per day for consultation contemporaneous with patient care.

OLMCP consultation, when desired or required, is to be made at the earliest appropriate point in the patient's assessment and treatment in order to facilitate appropriate patient care.

Radio reports to the OLMCP should follow Protocol 14H - Radio Report Communications. It is the responsibility of the consulting EMS professional to ensure a brief, yet pertinent report to meet the needs of the patient and the treating EMS professional(s). If the lead EMS professional is involved in performing critical interventions, other personnel may make the report under the guidance of the lead EMS professional as may be beneficial for accuracy. Communications should ideally be established via a recorded communication method.

Contact with OLMCP will be made in the following circumstances:

- All situations in which consultation is specifically required in these treatment protocols.
- Any situation in which the treating EMS professional(s) feel it in the best interest of the patient to obtain physician consultation, ensuring the most accurate EMS care possible for the patient’s condition.
- Any situation in which the EMS professional(s) feels extensive modification is required from the standard treatment and/or procedure protocols.
- All patients in whom a refusal of care and/or transport would, in the EMS professional’s judgment, place the patient, the EMS professional, and/or the EMS system at risk after appropriate attempts fail to produce needed results..

PROTOCOL 14E: On-Line Medical Control Physicians, cont.

Acceptable modification to the sequence of drugs or procedures must be justified as being appropriate for field management of critically ill or injured patients in unusual circumstances and therefore, should be an uncommon event.

EMS providers complying with orders which exceed their level of licensure and/or authorized scope of EMS practice may be subject to disciplinary action by the Oklahoma State Department of Health (as well as locally applicable action) which may include, but is not limited to, indefinite suspension or permanent revocation of licensure and authorization to provide patient care.

Medical Literature References
14E – On-Line Medical Control Physicians

1. Burstein JL, Hollander JE, Delagi R, Gold M, Henry MC, Alicandro JM.Refusal of out-of-hospital medical care: effect of medical-control physician assertiveness on transport rate. AcadEmerg Med. 1998 Jan;5(1):4-8.
2. Rottman SJ, Schriger DL, Charlop G, Salas JH, Lee S.On-line medical control versus protocol-based prehospital care.Ann Emerg Med. 1997 Jul;30(1):62-8.
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14F – HELICOPTER EMS (HEMS) CONSIDERATIONS

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Medical literature to date demonstrates no significant survival benefit utilizing medical helicopter transport for patients in densely populated, urban settings. The Oklahoma State Department of Health and the University of Oklahoma Department of Emergency Medicine EMS Division provide the following information regarding the clinically appropriate utilization of medical helicopters to maximize patient benefit and protect the safety of patients, aeromedical professionals, and ground EMS professionals.

"No Fly" Patient Conditions
Medical helicopter utilization rarely affects outcome in already moribund patients or in the converse, stable patients without apparent serious illness/injury. A medical helicopter should NOT be utilized for the following patients:

1. Medical or Traumatic Cardiac Arrest without Return of Spontaneous Circulation;
2. Trauma Patients with minimal traumatic injury, without apparent risk of life/limb loss;
3. Patients with stable vital signs and without signs of serious illness/injury.

"No Fly" Zones
Medical helicopter utilization is very rarely indicated within an approximate 30 minute radius of an appropriate destination hospital unless there are extenuating circumstances. These "extenuating circumstances" include the following:

1. Hazardous or impassible road conditions resulting in significant ground transport delays for seriously injured or ill patients;
2. Multiple casualty incidents with high numbers of red/priority 1 patients, overwhelming available ground EMS units;
3. A combination of lengthy extrication and extended ground transportation (traffic conditions, weather conditions) of a priority 1 or priority 2 patient at the lead EMS professional's careful discretion.

PROTOCOL 14F: Helicopter EMS (HEMS) Considerations, cont.

Medical Helicopter Utilization:

At incidents greater than 30 minutes from the appropriate destination hospital, the decision to activate a medical helicopter response should be based upon an EMS professional's assessment of the patient's clinical condition, factoring in apparent and/or suspected illness or injury, mechanisms of injury – if applicable, anticipated scene time, and anticipated ground transport time to an appropriate destination hospital (eg. cardiac catheterization capable hospital or trauma center). Medical helicopters should not be activated until an EMS professional or medically-trained law enforcement officer has assessed the patient. Further utilization concepts include:

1. EMS professionals on scene may elect to activate a medical helicopter if flight time to the incident, flight scene time, and return flight time would still allow a critical patient to arrive at an appropriate destination hospital significantly faster by air.
2. If ground EMS transport capability is not on scene and a decision is being factored as to ground or air transport, the on scene EMS professionals should first request an ETA for the ground transport unit. If the on scene EMS professionals then judge transport time by ground will be detrimental to the patient clinical condition, a medical helicopter response can be activated. This decision should be communicated to ground EMS agency to keep all responding apparatus crews aware of scene and patient dynamics.
3. If uncertain whether medical helicopter activation is in the best interest of the patient, contact OLMC at the anticipated destination hospital for consultation and determination of transport mode and destination.
4. The primary determinant of helicopter transport mode is to achieve getting the critical patient to the most appropriate definitive care hospital in the shortest amount of time. The medical helicopter to be utilized is the medical helicopter appropriate for the patient's needs and closest to the incident location.

Cancellation of Medical Helicopter Activation:

An EMS professional may cancel a medical helicopter response after being activated if patient condition significantly improves or deteriorates to meet "no fly" criteria. Keep in mind, though, that once a medical helicopter is responding to the scene, it is generally unwise to cancel that response. EMS professionals should avoid requesting a medical helicopter response, canceling the response, and then having to request the helicopter again. Such a situation prolongs scene time and helicopter response time in addition to conveying indecisive patient care.

Landing Zone:

Appropriate fire or law enforcement personnel will be responsible for establishing and maintaining a safe landing zone.

PROTOCOL 14F: Helicopter EMS (HEMS) Consideration, cont.

Utilization Review:

All medical helicopter activations should undergo utilization review by the medical director of the requesting organization and by the medical director of the aeromedical organization. This is to specifically promote optimal medical helicopter utilization and not to be interpreted as discouraging appropriate medical helicopter utilization per this protocol.

Medical Literature References
14F – Helicopter (HEMS) Considerations

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14G – PATIENT PRIORITIZATION

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

While each patient will receive the best possible EMS care in a humane and ethical manner, proper patient prioritization ensures that patients most dependent upon rapid and critical medical interventions receive expeditious field treatment and that destination hospitals receive early notification.

Red/Priority I: Patient condition expected to require immediate intervention upon Emergency Department arrival. Examples include:

- Inability to successfully oxygenate and/or ventilate;
- Acute dyspnea in adults requiring CPAP;
- Acute Myocardial Infarction with ST elevation on 12-Lead ECG;
- Acute Congestive Heart Failure with hypotension (Cardiogenic Shock);
- Acute Stroke with positive LAPSS with symptom onset < 3 hours in duration;
- Status epilepticus;
- Deep penetrating trauma (e.g. gunshot wound) to head, neck, or trunk;
- Trauma in adults with systolic blood pressure <90 mmHg;
- Trauma in pediatrics with systolic blood pressure < (70 + 2 X age in years) mmHg.

Red/Priority I patients are typically transported to the Emergency Department with red lights and sirens.

Yellow/Priority II: Patient condition expected to require intervention within 15 minutes upon Emergency Department arrival. Yellow/Priority II patients have potential time sensitive problems, are currently stable, but at risk for sudden deterioration. Examples include:

- Acute dyspnea in adults and pediatrics with normalizing vital signs;
- Acute non-traumatic chest pain in adults improving with protocol specified treatment;
- High force traumatic injuries with normal and stable vital signs.

Yellow/Priority II patients may be transported to the hospital red lights and sirens if time of transport would otherwise create marked risk to patient recovery. In most situations, though, the safety risk of red lights and sirens transport of these patients is unwarranted.

PROTOCOL 14G: Patient Prioritization, cont.

Green/Priority III: Patient condition expected to require routine timeliness of intervention upon Emergency Department arrival. Green/Priority III patients do not appear to require further emergent medical intervention and do not appear to have life/organ threatening conditions. Examples include:

- Asthma exacerbation dyspnea resolved with bronchodilator nebulization;
- Nausea/non-bloody vomiting with normal and stable vital signs;
- Isolated orthopedic injury with intact neurovascular function.

Green/Priority III patients should be transported to the hospital without red lights and without sirens. The safety risk of red lights and sirens transport of these patients is unwarranted.

Black or Blue: Obvious death or illness/injury severity incompatible with successful resuscitation given concurrent system demands (such as in multiple casualty responses).

Adult trauma patients are determined to be **Red/Priority I** by either vital signs and level of consciousness (systolic BP < 90 mmHg, sustained tachycardia, respiratory rate <10 or >29 breaths per minute, GCS ≤ 13, cool, diaphoretic skin) or any of the following anatomical injury:

- Penetrating injury of head, neck, torso, extremities proximal to elbow or knee;
- Amputation proximal to the wrist or ankle;
- Paralysis or suspected spinal fracture with neurological deficit;
- Flail chest;
- Two or more suspected proximal long - bone fractures;
- Open or suspected depressed skull fracture;
- Unstable pelvis or suspected pelvic fracture;
- Tender and/or distended abdomen;
- Burns associated with other Priority I Trauma;
- Crushed, degloved, or mangled extremity, proximal to the wrist or ankle.
- Pulseless extremity

Adult trauma patients are determined to be **Yellow/Priority II** from "high-energy" events with risk of severe injury despite normal and stable vital signs without change in usual mentation or usual neurologic function, or respiratory distress. Adult trauma patients may also be determined to be Yellow/Priority II if exhibiting a single system injury as noted:

- High risk auto crash (intrusion > 12 inches in occupant site; intrusion > 18 inches in any site; ejection (partial or complete) from automobile; death in same passenger compartment);
- Auto v. pedestrian/bicyclist thrown, run over, or with significant (>20 mph) impact;
- Motorcycle crash > 20 mph;
- Falls > 20 feet in height (one building story is 10 feet in height);
- Significant force alleged assault;
- Isolated closed head trauma with resolved altered mental status (Neuro System);
- Isolated fractures/dislocation; lacerations/avulsions without extensive tissue damage (Musculoskeletal System);

PROTOCOL 14G: Patient Prioritization, cont.

Adult Priority II Determining Criteria, cont.

Adult trauma patients are determined to be **Yellow/Priority II** from "high-energy" events with risk of severe injury despite normal and stable vital signs without change in usual mentation or usual neurologic function, or respiratory distress. Adult trauma patients may also be determined to be Yellow/Priority II if exhibiting a single system injury as noted:

- Facial lacerations; fractured facial bones; avulsed teeth (Maxillofacial/Dental);
- Isolated abdominal pain (Transport as Level II Trauma to facility as specified by TREC center);
- Select & isolated hand injuries ("isolated" defined by the level of suspected injury involvement being no further proximal than the carpal bones level).
  - Only certain hand injuries require rapid treatment to avoid unfavorable outcomes. These "select" Priority II injuries include:
    - Vascular injuries that involve significant arterial hemorrhage;
    - Nerve injuries that cause loss of motor function;
    - Amputations;
    - High-pressure injection injuries;
    - Flexor tendon injuries of hand.

Adult trauma patients may be determined to be **Discretionary Red/Priority I or Yellow/Priority II** if clinical suspicion of significant injury and heightened by any single or particularly a combination of the following patient attributes:

- Age > 55;
- Anticoagulation and bleeding disorders;
- Time sensitive extremity injury;
- End – stage renal disease requiring dialysis;
- Pregnancy > 20 weeks.

Discretionary Red/Priority I or Yellow/Priority II adult trauma patient radio and care reports should clearly indicate to the receiving Trauma Center personnel the rationale for the Discretionary Red/Priority I or Yellow/Priority II assignment.

Level III Trauma Centers are intended to receive adult patients at risk for severe injury with normal, stable vital signs or patients with no significant anatomical injuries.

Adult trauma patients are determined to be **Green/Priority III** from "low energy" events with normal and stable vital signs, without change in usual mentation or usual neurologic function, and without new or significant organ system dysfunction. Green/Priority III adult trauma may include:

- Single bone fractures from a same level fall;
- Minor puncture wounds/lacerations/abrasions;
- Isolated neck pain without new neurological deficit;
- Isolated extremity pain.

PROTOCOL 14G: Patient Prioritization, cont.

Level IV Trauma Centers may receive adult patients without physiologic instability, altered mentation, neurological deficit or significant anatomical injuries and have also not been involved in a significant mechanism of injury incident for expected care at that facility. Patients in other categories (eg. with physiologic instability) should be expected to be transferred to a higher level trauma center after immediate care needs are addressed (eg. invasive airway management).

SEE ALSO SECTION 19 RESOURCE: OKLAHOMA MODEL TRAUMA TRIAGE ALGORITHM

Pediatric (Age < 16 years of age) general medical patients are determined **Red/Priority I** to be if the following organ system dysfunction is evidenced by acute symptoms or physical exam signs:

Pulmonary System:

- Respiratory arrest;
- Respiratory distress and inability to maintain O_2 sat > 95% on 100% supplemental O_2;
- Stridor with inability to phonate, weak cry, altered mental status, or pallor.

Cardiovascular System:

- Cardiac arrest (or history of pre-arrival CPR) or bradycardia requiring chest compression;
- Multiple shock signs (pallor, cool, slow capillary refill, weak pulse, altered mental status);
- Persistent tachycardia > 200/min or bradycardia< 80/min (without athletic fitness level).

Neurologic System

- Status epilepticus;
- Acute sustained altered mental status without apparent etiology;
- Acute focal neurological deficits.

Metabolic System/Toxicology (Overdose)

- Ingestion of a tricyclic antidepressant;
- Ingestion, inhalation, or contact exposure causing altered mental status, respiratory distress, or shock.

Pediatric (Age ≤ 16 years of age) general medical patients are determined to be **Green/Priority III** if there does not appear to be an acute medical problem of life/organ threatening severity.

Pediatric trauma patients are prioritized **Red/Priority I** by either physiological criteria (systolic BP < (70 + 2 x age of patient in years) mmHg, sustained tachycardia >180 bpm, respiratory rate <10 (<20 in infant less than one year of age) or >29, pulse oximetry<95% without supplemental oxygen, or GCS ≤ 13) or any of the adult trauma Red/Priority I anatomical injury criteria.

Fall criteria for pediatric trauma Red/Priority I is >10 feet or 2 – 3 times the height of the child.

PROTOCOL 14G: Patient Prioritization, cont.

Pediatric trauma patients are prioritized **Yellow/Priority II** from "high-energy" events with risk of severe injury despite normal and stable vital signs without change in usual mentation or usual neurologic function, or respiratory distress. Pediatric trauma patients may also be determined to be Yellow/Priority II if exhibiting any of the adult trauma priority II single system injury criteria.

Pediatric trauma patients may be determined to be **Discretionary Red/Priority I or Yellow/Priority II** if clinical suspicion of significant injury warrants and is heightened by any of the following patient attributes:

- Anticoagulation and bleeding disorders;
- Pregnancy > 20 weeks;
- Extrication time > 20 mins, *death in same vehicle, speed >40 mph, rollover mechanism, vehicle external intrusion >20" or compartment intrusion >12".

Discretionary Red/Priority I or Yellow/Priority II pediatric trauma patient radio and care reports should clearly indicate to the receiving Trauma Center personnel the rationale for the Discretionary Red/Priority I or Yellow/Priority II assignment.

Pediatric trauma patients are determined to be **Green/Priority III** from "low energy" events with normal and stable vital signs, without change in usual mentation or usual neurologic function, and without new or significant organ system dysfunction. Green/Priority III pediatric trauma may include any of the adult trauma Green/Priority III injury criteria as previously listed in this protocol.

SEE ALSO SECTION 19 RESOURCE: OKLAHOMA MODEL TRAUMA TRIAGE ALGORITHM

Specialized Burn Care

In Oklahoma, the following burn care specialty centers exist:

Oklahoma City:	Adult - Integris Baptist Medical Center
	Pediatric - OU Medical Center Childrens
Tulsa:	Adult/Pediatric - Hillcrest Medical Center.

Patients with the following burn injuries (without additional trauma center criterion injuries) should either be transported directly to a burn care specialty center or be referred to such after initial emergency department evaluation:

- Partial thickness(second degree) burns >10% total body surface area (TBSA);
- Full thickness (third degree) burns;
- Partial or full thickness burns of the face, hands, feet, genitalia/perineum, or major joints;
- Electrical burns (includes lightning injury), inhalation burns, chemical burns;
- Burn injury in patients with preexisting medical disorders compromising healing and survival (cardiac disease, chronic respiratory illness, diabetes);
- Multisystem trauma with partial or full thickness burn as the predominant injury.

If the burn patient cannot be oxygenated or ventilated, transport the patient to the nearest appropriate emergency department for airway management.

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14G – Patient Prioritization

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14H – RADIO REPORT COMMUNICATIONS

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Radio Report Format:

A. Identification (Apparatus ID, Personnel Last Name & Licensure) & Estimated Time of Arrival
B. Patient Priority – Red/Priority 1; Yellow/Priority 2; Green/Priority 3
C. Objective of communication - Notification of transport only or request for on-line medical control. Be specific in what orders will be requested from on-line medical control so that the physician (or designate) will be oriented to the request as he/she is listening to the report
D. Patient Information – Age/Sex/Chief Complaint or Condition/Pertinent Past Medical History
E. Patient Condition – LOC/Vital Signs/Exam Findings/ECG Interpretation
F. Treatment and response to treatment.

Notes:

A. All communications should be brief and orderly. Radio reports should rarely take longer than one or two minutes per patient and should be made on a recorded line.

B. Describe the patient condition in enough detail to explain treatment initiated and rationale for any request(s). Remember while the patient's condition may be visually obvious, the nurse or physician on the radio or phone is completely dependent on the EMS professional's ability to verbally "paint the picture of the patient".

C. It is critical to notify the receiving emergency department at the earliest opportunity to describe the patient's illness/injury and condition so that emergency department personnel can be appropriately prepared for the patient's arrival, including preparing resources to ensure continuity of care (eg. respiratory care, cardiac pacing, trauma surgery notification). In many instances, the earliest opportunity for a radio report will occur even before discovering the full extent of illness or injury in the critical patient. It is important that the "lead EMS professional" or his/her designee make the report at this time, especially to report a STEMI Alert, Stroke Alert, or Trauma Alert rather than wasting several minutes of hospital pre-arrival notification trying to make a "more complete" report.

D. Particularly critical objective findings, (eg. cardiac arrest, critically abnormal vital signs, gunshot wound to chest) need to take precedence in a radio report and should be reported after the identification/ETA and patient priority statements.

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14H – Radio Report Communications

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Oklahoma State Department of Health

EMERGENCY MEDICINE UNIVERSITY OF OKLAHOMA
EMS DIVISION

14I – INTERHOSPITAL TRANSFERS

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

A patient may require a transfer from one hospital to another hospital if:

1. Patient evaluation at the original hospital reveals care needs unavailable at that hospital
2. Another hospital is preferred by the patient, the patient's legal representative, or the patient's established physician(s)

A hospital must agree to facilitate a patient transfer (regardless of patient's financial status) if the patient meets any of the above criteria.

Any interhospital transfer must be arranged as a practitioner/physician-to-physician transfer in accordance with Federal regulations.

Prior to any interhospital transfer, the EMS professional must receive appropriate transfer paperwork, including an adequate summary of the patient's condition, current treatment (including nursing and practitioner/physician evaluation notes, lab results, radiology results and films, possible complications that could occur during transfer, and any further medical information deemed necessary by the EMS professional or physician(s). Any anticipated interhospital transfer treatment orders are to be written and signed by the transfer initiating practitioner/physician.

Prior to any interhospital transfer, if the EMS professional is concerned that the patient is not stabilized to the extent possible for transport, the EMS professional shall review his /her concerns with the transferring practitioner/physician with a goal to ensure appropriate clinical care is performed to further stabilize the patient. In the **rare** instance in which the paramedic and transferring practitioner/physician cannot agree on the stability of the patient and/ or further care necessary prior to the interhospital transfer, the EMS professional is to consult with the accepting physician at the receiving hospital to review these concerns. If in such situation the receiving hospital has automatically accepted the patient for care to the "emergency group/doctor", the EMS professional is to discuss concerns with the on-duty emergency physician at that hospital. If the EMS professional cannot rapidly resolve the situation with the transferring practitioner/physician and receiving physician, the paramedic is to notify the medical director for intervention, ideally via a recorded line.

PROTOCOL 14I: Interhospital Transfers, cont.

The overriding principle for all aspects of interhospital transfer is matching patient needs with adequate provider knowledge and skill, equipment and infrastructure that provide continued patient safety during transport.

It the professional and ethical responsibility of an EMS professional as well as of an EMS organization to not accept or perform an interhospital transfer that involves monitoring and treatment exceeding their scope of authorized practice, training, and/or ability.

An EMS professional licensed as an EMT – I85 or higher to verify patency of vascular access. IV fluid type and flow rate must be specified in written practitioner/physician orders and verified prior to interhospital transfer. Any IV fluid bag supplied must contain enough solution to accommodate the expected interhospital transport time.

Any IV infusion medications must be specified in written practitioner/physician orders and verified prior to interhospital transfer. The paramedic is to verify all IV infusion medications ordered during the interhospital transfer are on the pre-approved list contained in this protocol. Medications that are not on the pre-approved list must be specifically approved by one of the receiving hospital's on-line medical control emergency physicians or the accepting physician prior to transport. There is a limit of 4 concurrent IV infusion medications for paramedic-only accompanied interhospital transfers.

All interhospital transfer patients with IV infusion medications will be continuously cardiac monitored, including monitoring pulse oximetry during transport. Waveform capnography should be utilized as indicated by appropriate protocols. Blood pressure monitoring will be at least as frequently as every 10 minutes with a minimum of two blood pressure recordings. The interhospital transfer orders may specify more frequent measurements.

During interhospital transfer, should the patient experience signs or symptoms of intolerance (significant side effects) to the IV infusion medication(s), the IV line infiltrates, or the IV infusion pump indicates an error not easily addressed by the Paramedic, stop the infusion and consult the transferring hospital's on-line medical control for direction.

Mechanical ventilation settings must be confirmed with either the transferring practitioner/physician or a respiratory therapist. The paramedic must review and confirm ventilation rate, tidal volume, FiO2 (50% or 100%), and positive-end expiratory pressure (PEEP) settings. If at any time during interhospital transfer mechanical ventilation malfunctions, institute bag-valve assisted ventilations with 100% O2 while troubleshooting the mechanical ventilator and airway circuit. Ensure the patient receives appropriate oxygenation and ventilation continuously.

All indwelling devices and lines (e.g. chest tube(s), naso/orogastric tube, PEG/G/J-tube, surgical drain(s), intra-aortic balloon pump (IABP), ventricular assist device (VAD), wound vacuum) must be reviewed with either the transferring practitioner/physician or appropriate nursing personnel. Potential complications during transfer should be discussed and contingency plans reviewed. If the paramedic feels unable to safely monitor and maintain any indwelling device, he or she is to request appropriate nursing or ancillary personnel from the transferring hospital to accompany the patient during transfer.

PROTOCOL 14I: Interhospital Transfers, cont.

Under these conditions, EMS personnel will not begin the transfer until such request is accommodated.

***For specialized patients not ordinarily transported by paramedics (e.g., high-risk obstetrical patients, neonates) or for any patient with a condition requiring interhospital assessment and/or treatment beyond expected paramedic scope of practice, an appropriately trained healthcare professional is to accompany the transporting paramedic to best provide interhospital transfer care.

For acute stroke patients either having received alteplase (tPA®) just prior to interhospital transfer or that will be continuing to receive alteplase during interhospital transfer, specific documentation and treatment should include:

1. Vital signs prior to transport and every 10 minutes enroute. Verify that systolic blood pressure is less than 180mmHg and diastolic blood pressure is less than 105mmHg. If blood pressure exceeds these limits, the transferring hospital is to lower the blood pressure via anti-hypertensives for further vascular stabilization prior to transport.

2. Stroke neuro-exam at time of interhospital transfer, utilizing the Los Angeles Prehospital Stroke Screen.

3. Oxygen administration via NC or NRB if dyspnea or SpO2 <94% at room air.

4. Head of cot elevated at approximately 15 degrees if tolerated and low risk of aspiration.

5. Patient NPO status, including medications, to protect against aspiration.

6. Documentation of total dose and time of IV alteplase bolus (if dose is completed prior to transfer) and when infusion started (and completed, if applicable).

7. Infuse all alteplase from tubing by infusing saline through same tubing set following alteplase dose.

   - When bottle appears empty, there is still some alteplase left in the tubing which must be infused.
   - Remove the IV tubing connector from the bottle and attach it to a newly spiked bag of normal saline and re-start infusion, TKO.

8. Anti-hypertensive therapy adjustment enroute:
   - If labetalol IV infusion started at sending facility: Increase infusion rate by 2mg/min every10 minutes (to maximum of 8mg/min) until desired decrease in BP:
     Sys BP <180mmHg and Dia BP <105mmHg
   - If nicardipine IV infusion started at sending facility: Increase infusion rate by 2.5mg/hr every10 minutes(to maximum of 15mg/hr) until desired decrease in BP:
     Sys BP <180mmHg and Dia BP <105mmHg
   - Discontinue anti-hypertensive infusion for any one of the following:
     Sys BP <140mmHg, Dia BP <80mmHg, or heart rate <50 per minute

PROTOCOL 14I: Interhospital Transfers, cont.

OSDH Pre-Approved IV Medications During Interhospital Transfer
(Infusions are continuation of infusions started at the transferring facility, not initiations)

Class of Medication	Significant Side Effects
Sedatives	
Diazepam (Valium®) Diprivan (Propofol®) Lorazepam (Ativan®) Midazolam (Versed®)	Respiratory depression, Hypotension
Opiate Analgesics	
Fentanyl (Sublimaze®) Hydromorphone (Dilaudid®) Meperidine (Demerol®) Morphine Nalbuphine (Nubain®)	Respiratory depression, Hypotension
Hypertension Control Agents	
Labetalol (Normodyne®, Trandate®) Nicardipine (Cardene®) Nitroprusside(Nipride®)	Hypotension, Symptomatic bradycardia Symptomatic tachycardia, Ventricular dysrhythmias
Acute Coronary Syndrome Agents	
Anti-platelet (Clot Inhibitors)	
Abciximab (ReoPro®) Eptifibatide (Integrilin®)	Bleeding
Anti-coagulant (Clot Inhibitors)	
Heparin	Bleeding
Thrombolytic ("Clot Buster")	
Alteplase (tPA®) Reteplase (Retavase®) Tenectaplase (TNKase®)	Bleeding
Anti-anginal (Coronary Vasodilator)	
Nitroglycerin (Tridil®)	Hypotension

PROTOCOL 14I: Interhospital Transfers, cont.

OSDH Pre-Approved IV Medications during Interhospital Transfer, cont.
(Infusions are continuation of infusions started at the transferring facility, not initiations)

Class of Medication	Significant Side Effects
Cardiac Anti-arrhythmics	
Amiodarone (Cordarone®, Pacerone®) Diltiazem (Cardizem®) Lidocaine Procainamide	Hypotension, Symptomatic bradycardia Symptomatic tachycardia, Ventricular dysrhythmias
Vasopressors (Hypotension Treatment)	
Dobutamine (Dobutrex®) Dopamine (Intropin®) Epinephrine Norepinephrine (Levophed®) Phenylephrine (Neosynephrine®)	Hypertension, Symptomatic tachycardias Ventricular dysrhythmias
Volume Expanders (Hypovolemia Treatment)	
Albumin Dextran Hetastarch (Hespan®) Plasma protein fraction (Plasmanate®)	Allergic reactions ranging from itching only to more serious reactions of hives, (urticaria), respiratory distress (typically bronchospasm), tachycardia, and hypotension (evidence of anaphylaxis).
Blood Products (Anemia or Coagulopathy Treatment)	
Cryoprecipitate Frozen Plasma (FFP) Packed Red Blood Cells (PRBC) Platelets Whole Blood	Allergic reactions ranging from itching only to more serious reactions of hives, (urticaria), respiratory distress (typically bronchospasm), tachycardia, and hypotension (evidence of anaphylaxis).
Gastrointestinal Bleeding Control Agents	
Esomeprazole (Nexium® – acid reducer) Octreotide (Sandostatin®–varices constrictor) Pantoprazole (Protonix® – acid reducer)	None
Acid-Base Metabolism Agents	
Sodium Bicarbonate	None

PROTOCOL 14I: Interhospital Transfers, cont.

OSDH Pre-Approved IV Medications during Interhospital Transfer, cont.
(Infusions are continuation of infusions started at the transferring facility, not initiations)

Class of Medication	Significant Side Effects
Hyperglycemia Control Agents	
Insulin	Hypoglycemia-related complications
Electrolyte Replacement	
Potassium chloride (KCL)	Ventricular dysrhythmias
Seizure Control Agent	
Fosphenytoin (Cerebyx®) Magnesium (for eclampsia) Phenytoin (Dilantin®) Phenobarbital	Respiratory depression, Hypotension, Symptomatic bradycardia
Bronchospasm Control Agents	
Aminophylline (Theophylline®)	Symptomatic tachycardias, Hypertension
Pregnancy - Related Agents	
Oxytocin (Pitocin®–stimulates uterine contraction Inducing labor and controls uterine bleeding)	Hypotension (if rapid infusion), Symptomatic tachycardias, Hypertension
Anti-microbials/Antibiotics	
Aminoglycosides (e.g. gentamicin) Antifungals (e.g. fluconazole) Anti-TB (e.g. isoniazid - INH) Anti-viral (e.g. acyclovir) Carbapenams (e.g. imipenem) Cephalosporins (e.g. cetriaxone) Macrolides (e.g. azithromycin) Penicillins (e.g. ampicillin; piperacillin) Quinolones (e.g. levofloxacin) Sulfonamides (e.g. TMP-SMX, Bactrim®) Other categories (e.g. clindamycin, vancomycin)	Allergic reactions ranging from itching only to more serious reactions of hives (urticaria), respiratory distress (typically bronchospasm), tachycardia, and hypotension (evidence of anaphylaxis). In some cases, a localized phlebitis (pain at infusion site with redness of vein) may occur due to irritation cause by the infusion itself. While the infusion is to be stopped, this usually is not a true allergy.

15A – MULTIPLE PATIENT SCENES/ MASS CASUALTY EVENT CONCEPTS

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

A Multi-Patient Scene (MPS) occurs when an incident involves more than one patient, but less than 5 critical patients and less than 10 total patients.

A Mass Casualty Incident (MCI) occurs when an incident involves several patients, specifically including five or greater critical patients or ten or more total patients, regardless of patient priority composition.

Incident command at multiple patient scenes (MPS) or mass casualty incidents (MCI) will be assigned according to the National Incident Management System (NIMS) guidelines and a unified command team consisting of representatives of police, fire, and EMS should be rapidly assigned and coordinated to ensure safe, efficient, and effective operations.

Multi-Patient Scene Tasks:

1. Initial Size-up Actions: (these are the same for Mass Casualty Incidents)
    a. Park ambulance in safe location at scene perimeter.
    b. Advise dispatch:
2. Incident location (if different from initial dispatch)
3. Incident type (transportation accident, fire, etc. if different from initial dispatch)
4. Estimated number of patients.
5. Numbers & types of additional resources needed.
6. Any hazardous conditions (weather, electrical, structural, toxic chemicals, etc).
    a. Identify a “HOT ZONE”/”Immediate Danger Zone” if applicable
7. Best route & access to scene (if appropriate).
8. Staging area location (if staging indicated).

PROTOCOL 15A: Multi-Patient Scenes/Mass Casualty Incident Concepts (cont.)

Multi-Patient Scene Tasks, cont.:

1. Establish the following roles:

2. Medical Sector Coordinator:
   a. COORDINATE PATIENT CARE, refraining from "hands-on" treatment.
   b. Establish appropriate EMSA communications.
   c. Assign arriving ambulances to specific patients.
   d. Maintain MPS worksheets, ensuring patient destination accountability

3. Triage Officer:
   a. Perform rapid triage and "tag" patients with numbered triage tags.
   b. Fill out patient log, indicate triage tag color, age/sex.
   c. Relay initial triage information to the Medical Sector Coordinator and continue to update patient numbers and status as needed.
   d. After triage is completed, report to Medical Sector Coordinator for reassignment to treatment or transportation teams as needed.

Mass Casualty Incident Tasks:

First ALS Unit on the Scene:

1. Perform initial size-up actions as listed in multi-patient scene tasks
2. Don identification vests, establishing Medical Command, and utilize task cards.

Medical Command will coordinate the activities of Triage, Treatment, Transport, & Communications Sectors. Sector officers will be assigned by Medical Command and report directly back to Medical Command. Medical Command will report to Incident Unified Command officers according to NIMS guidelines.

PROTOCOL 15A: Multi-Patient Scenes/Mass Casualty Incident Concepts (cont.)

Triage Sector Tasks:

1. Initial triage is at casualty locations unless hazards indicate that rapid extrication or casualty self-extrication should occur to a designated area safe for triage operations. In some instances, the use of priority-specific colored tape (red, yellow, green, black/blue) may be utilized to mark patients in the absence of readily usable triage tags.
2. Perform first pass (initial) triage. Do not perform any treatment in first pass triage other than very quick, simple and extremely urgent measures (i.e., open the airway by positioning). Move quickly to ensure all casualties are identified and triaged to minimize loss of life and limb.
3. Attach tag to patient using the string loop directly on their body. Over the head or on the upper arm works well. The left extremities should be utilized unless extremely injured. This will make it easier to utilize the triage tag during transport.
4. Tear off the appropriate strips on the tag to indicate triage category. Use a reliable method to count the number of patients in each category. This information will need to be relayed to the triage sector officer and in turn, the medical command officer.
5. Direct ambulatory patients to the GREEN treatment area when it is established. Use discretion in allowing GREEN patients to assist in caring for the YELLOW and RED patients while those more serious casualties are awaiting extrication to the treatment areas. ALL persons involved in the incident are to be triaged and tagged - those without apparent injuries should be tagged GREEN.
6. Report number of casualties in each category and in total to the triage sector officer.
7. Repeat triage sequence as changes in any casualty's condition occurs. Time an circumstances allowing, perform more detailed assessment, treatment, and write-in information on the tag while casualties are being extricated to the treatment sector.

PROTOCOL 15A: Multi-Patient Scenes/Mass Casualty Incident Concepts (cont.)

Treatment Sector Tasks:

1. Establish treatment area in consultation with Medical Command regarding location. Think BIG to allow adequate space to treat casualties. Ensure the location promotes relative ease of ambulance loading and egress.
2. Assemble into crews of at least 2 personnel equipped with a backboard and straps for assignment by the treatment sector officer to perform BASIC packaging and extrication of triaged casualties into the Red, Yellow, and Green treatment areas. The treatment sector officer may choose to have separate personnel perform treatment once inside the treatment area, depending on the logistics of the particular call. All persons involved in the incident triaged Green due to very minor or no apparent injury are to be kept in the Green treatment area until more fully evaluated (unless EMS personnel assign Green casualties to assist with Yellow or Red casualties). These individuals will be released at an appropriate time by the transport sector officer in consultation with law enforcement authorities. Depending on the circumstances, some of these non-injured Green casualties may still require a coordinated transport from the incident.
3. On the clinical side of the triage tag, circle injuries on the body diagram, note the BP, pulse, and respirations. Note any IM or IV medication given and the time it was given. On the administrative side of the tag, note the time, date, patient name, address, city, state, and past medical history and prescriptions. Record the primary EMS caregiver.
4. If a casualty's condition worsens (e.g. Yellow to Red; Green to Yellow) inside the treatment sector, apply a new triage tag indicating the more serious condition (leaving the original tag in place to indicate a change in condition occurred) and move them to the appropriate area in the treatment sector. Notify the treatment sector officer of any change in casualty condition so that this may be recorded for overall patient accountability and reporting to Medical Command and Unified Incident Command.

Transportation Sector Tasks:

1. Establish patient loading zone. Consider proximity to treatment area and ambulance approach AND exit routes. Establish ambulance traffic routes that prevent ambulances from having to back-up to load patients. This makes for safer and more efficient transport operations. While multiple ambulances may be in staging, keep no more than 2 ambulances in the immediate load zone. This makes for more accurate and efficient transport operations. Work with staging to ensure at least 1 ambulance is always in the loading zone. Ensure vehicle operators stay with their ambulances to ensure as soon as patients are loaded, the ambulance leaves.
2. Communicate with treatment sector officer when ambulances are available for transport. NO MORE THAN ONE CATEGORY RED PATIENT PER AMBULANCE. May take another patient if yellow/green in category.
3. Supervise the loading of patients. While patients are loaded, tell the Communications Officer the ambulance unit ID and number/category/type of patients assigned.
4. As a patient leaves the scene, by ANY means the transport sector officer or the officer's designee should remove the remaining unique number identifier slip from the triage tag. This slip should be notated with patient's name (if known), condition, and destination. ***Patient condition and destination are mandatory for notation regarding all victims, including those without apparent injuries.

PROTOCOL 15A: Multi-Patient Scenes/Mass Casualty Incident Concepts (cont.)

Communications Sector Tasks:

1. Start MCI log, using information from the Transportation Sector Officer.
2. Always designate a communications assistant to assure an organized flow of information from scene to hospital. Communications Sector tasks cannot be accurately managed by one individual.
3. Request additional ambulances needed through Medical Command.
4. As soon as a unit is ready to transport, advise EMS dispatch the ambulance unit ID and number/category/type of patients assigned (e.g. Medic 101 has 1/Red/Chest Injury and 1/Green/Ankle Injury). EMS dispatch will determine that unit's destination.
5. Inform crew of loaded ambulance of its destination, ensure its safe departure, and immediately request another ambulance to the loading zone from the staging area.
6. Establish communications with receiving hospital and inform emergency department personnel the ambulance unit ID and number/category/type of patients assigned (e.g. Medic 101 has 1/Red/Chest Injury and 1/Green/Ankle Injury).
7. Transporting units should not communicate directly with the receiving hospital unless the condition of the patient deteriorates and Medical Control contact is necessary for the management of the patient.

Staging Sector Tasks:

1. The Staging Sector Officer should coordinate an orderly arrangement of arriving apparatus to allow for ease of ambulance ingress to the transport loading zone.
2. The Staging Sector Officer or the officer's designee should maintain a log of available resources in staging and communicate with Medical Command resource levels as appropriate and as requested by Medical Command.
3. The Staging Sector Officer or the officer's designee should assure ambulance operators stay with their assigned vehicles to assure rapid availability of the ambulance when requested at the transport loading zone.
4. Deliver equipment needed in the treatment sector that is requested from staging in an organized cache with a minimum of personnel leaving the staging area to deliver this equipment. Alternatively, all the requested equipment may be sent to the treatment area on one designated vehicle.

Medical Literature References
14I – Interhospital Transfers

1. American College of Emergency Physicians. Appropriate Interhospital Patient Transfer. Ann Emerg Med. 2009;54:141.
2. Warren J, Fromm RE Jr, Orr RA, Rotello LC, Horst HM; American College of Critical Care Medicine. Guidelines for the inter- and intrahospital transport of critically ill patients. Crit Care Med. 2004 Jan;32(1):256-62.
3. National Assoc of EMS Physicians. Medical Direction of Interfacility Transport. Prehosp Emerg Care. 2000;4:361-4.

SECTION 15

MASS/CASUALTY/DISASTER/TERRORIST EVENTS

15A – MULTIPLE PATIENT SCENES/ MASS CASUALTY EVENT CONCEPTS

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

A Multi-Patient Scene (MPS) occurs when an incident involves more than one patient, but less than 5 critical patients and less than 10 total patients.

A Mass Casualty Incident (MCI) occurs when an incident involves several patients, specifically including five or greater critical patients or ten or more total patients, regardless of patient priority composition.

Incident command at multiple patient scenes (MPS) or mass casualty incidents (MCI) will be assigned according to the National Incident Management System (NIMS) guidelines and a unified command team consisting of representatives of police, fire, and EMS should be rapidly assigned and coordinated to ensure safe, efficient, and effective operations.

Multi-Patient Scene Tasks:

1. Initial Size-up Actions: (these are the same for Mass Casualty Incidents)
    a. Park ambulance in safe location at scene perimeter.
    b. Advise dispatch:
2. Incident location (if different from initial dispatch)
3. Incident type (transportation accident, fire, etc. if different from initial dispatch)
4. Estimated number of patients.
5. Numbers & types of additional resources needed.
6. Any hazardous conditions (weather, electrical, structural, toxic chemicals, etc).
    a. Identify a “HOT ZONE”/”Immediate Danger Zone” if applicable
7. Best route & access to scene (if appropriate).
8. Staging area location (if staging indicated).

PROTOCOL 15A: Multi-Patient Scenes/Mass Casualty Incident Concepts (cont.)

Multi-Patient Scene Tasks, cont.:

1. Establish the following roles:

2. Medical Sector Coordinator:
   a. COORDINATE PATIENT CARE, refraining from "hands-on" treatment.
   b. Establish appropriate EMSA communications.
   c. Assign arriving ambulances to specific patients.
   d. Maintain MPS worksheets, ensuring patient destination accountability

3. Triage Officer:
   a. Perform rapid triage and "tag" patients with numbered triage tags.
   b. Fill out patient log, indicate triage tag color, age/sex.
   c. Relay initial triage information to the Medical Sector Coordinator and continue to update patient numbers and status as needed.
   d. After triage is completed, report to Medical Sector Coordinator for reassignment to treatment or transportation teams as needed.

Mass Casualty Incident Tasks:

First ALS Unit on the Scene:

1. Perform initial size-up actions as listed in multi-patient scene tasks
2. Don identification vests, establishing Medical Command, and utilize task cards.

Medical Command will coordinate the activities of Triage, Treatment, Transport, & Communications Sectors. Sector officers will be assigned by Medical Command and report directly back to Medical Command. Medical Command will report to Incident Unified Command officers according to NIMS guidelines.

PROTOCOL 15A: Multi-Patient Scenes/Mass Casualty Incident Concepts (cont.)

Triage Sector Tasks:

1. Initial triage is at casualty locations unless hazards indicate that rapid extrication or casualty self-extrication should occur to a designated area safe for triage operations. In some instances, the use of priority-specific colored tape (red, yellow, green, black/blue) may be utilized to mark patients in the absence of readily usable triage tags.
2. Perform first pass (initial) triage. Do not perform any treatment in first pass triage other than very quick, simple and extremely urgent measures (i.e., open the airway by positioning). Move quickly to ensure all casualties are identified and triaged to minimize loss of life and limb.
3. Attach tag to patient using the string loop directly on their body. Over the head or on the upper arm works well. The left extremities should be utilized unless extremely injured. This will make it easier to utilize the triage tag during transport.
4. Tear off the appropriate strips on the tag to indicate triage category. Use a reliable method to count the number of patients in each category. This information will need to be relayed to the triage sector officer and in turn, the medical command officer.
5. Direct ambulatory patients to the GREEN treatment area when it is established. Use discretion in allowing GREEN patients to assist in caring for the YELLOW and RED patients while those more serious casualties are awaiting extrication to the treatment areas. ALL persons involved in the incident are to be triaged and tagged - those without apparent injuries should be tagged GREEN.
6. Report number of casualties in each category and in total to the triage sector officer.
7. Repeat triage sequence as changes in any casualty's condition occurs. Time an circumstances allowing, perform more detailed assessment, treatment, and write-in information on the tag while casualties are being extricated to the treatment sector.

PROTOCOL 15A: Multi-Patient Scenes/Mass Casualty Incident Concepts (cont.)

Treatment Sector Tasks:

1. Establish treatment area in consultation with Medical Command regarding location. Think BIG to allow adequate space to treat casualties. Ensure the location promotes relative ease of ambulance loading and egress.
2. Assemble into crews of at least 2 personnel equipped with a backboard and straps for assignment by the treatment sector officer to perform BASIC packaging and extrication of triaged casualties into the Red, Yellow, and Green treatment areas. The treatment sector officer may choose to have separate personnel perform treatment once inside the treatment area, depending on the logistics of the particular call. All persons involved in the incident triaged Green due to very minor or no apparent injury are to be kept in the Green treatment area until more fully evaluated (unless EMS personnel assign Green casualties to assist with Yellow or Red casualties). These individuals will be released at an appropriate time by the transport sector officer in consultation with law enforcement authorities. Depending on the circumstances, some of these non-injured Green casualties may still require a coordinated transport from the incident.
3. On the clinical side of the triage tag, circle injuries on the body diagram, note the BP, pulse, and respirations. Note any IM or IV medication given and the time it was given. On the administrative side of the tag, note the time, date, patient name, address, city, state, and past medical history and prescriptions. Record the primary EMS caregiver.
4. If a casualty's condition worsens (e.g. Yellow to Red; Green to Yellow) inside the treatment sector, apply a new triage tag indicating the more serious condition (leaving the original tag in place to indicate a change in condition occurred) and move them to the appropriate area in the treatment sector. Notify the treatment sector officer of any change in casualty condition so that this may be recorded for overall patient accountability and reporting to Medical Command and Unified Incident Command.

Transportation Sector Tasks:

1. Establish patient loading zone. Consider proximity to treatment area and ambulance approach AND exit routes. Establish ambulance traffic routes that prevent ambulances from having to back-up to load patients. This makes for safer and more efficient transport operations. While multiple ambulances may be in staging, keep no more than 2 ambulances in the immediate load zone. This makes for more accurate and efficient transport operations. Work with staging to ensure at least 1 ambulance is always in the loading zone. Ensure vehicle operators stay with their ambulances to ensure as soon as patients are loaded, the ambulance leaves.
2. Communicate with treatment sector officer when ambulances are available for transport. NO MORE THAN ONE CATEGORY RED PATIENT PER AMBULANCE. May take another patient if yellow/green in category.
3. Supervise the loading of patients. While patients are loaded, tell the Communications Officer the ambulance unit ID and number/category/type of patients assigned.
4. As a patient leaves the scene, by ANY means the transport sector officer or the officer's designee should remove the remaining unique number identifier slip from the triage tag. This slip should be notated with patient's name (if known), condition, and destination. ***Patient condition and destination are mandatory for notation regarding all victims, including those without apparent injuries.

PROTOCOL 15A: Multi-Patient Scenes/Mass Casualty Incident Concepts (cont.)

Communications Sector Tasks:

1. Start MCI log, using information from the Transportation Sector Officer.
2. Always designate a communications assistant to assure an organized flow of information from scene to hospital. Communications Sector tasks cannot be accurately managed by one individual.
3. Request additional ambulances needed through Medical Command.
4. As soon as a unit is ready to transport, advise EMS dispatch the ambulance unit ID and number/category/type of patients assigned (e.g. Medic 101 has 1/Red/Chest Injury and 1/Green/Ankle Injury). EMS dispatch will determine that unit's destination.
5. Inform crew of loaded ambulance of its destination, ensure its safe departure, and immediately request another ambulance to the loading zone from the staging area.
6. Establish communications with receiving hospital and inform emergency department personnel the ambulance unit ID and number/category/type of patients assigned (e.g. Medic 101 has 1/Red/Chest Injury and 1/Green/Ankle Injury).
7. Transporting units should not communicate directly with the receiving hospital unless the condition of the patient deteriorates and Medical Control contact is necessary for the management of the patient.

Staging Sector Tasks:

1. The Staging Sector Officer should coordinate an orderly arrangement of arriving apparatus to allow for ease of ambulance ingress to the transport loading zone.
2. The Staging Sector Officer or the officer's designee should maintain a log of available resources in staging and communicate with Medical Command resource levels as appropriate and as requested by Medical Command.
3. The Staging Sector Officer or the officer's designee should assure ambulance operators stay with their assigned vehicles to assure rapid availability of the ambulance when requested at the transport loading zone.
4. Deliver equipment needed in the treatment sector that is requested from staging in an organized cache with a minimum of personnel leaving the staging area to deliver this equipment. Alternatively, all the requested equipment may be sent to the treatment area on one designated vehicle.

15B– REGIONAL EMS SYSTEM (REMSS) ACTIVATION PROCEDURE

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

All requests for REMSS deployment will need to be validated through information provided on the request form contained within this protocol. The REMSS deployment request form can also be found within the Oklahoma REMSS Ambulance Strike Team (AST) Guidelines.

Medical Branch Request for REMSS Assistance is accomplished in the following sequence:

1. Before any REMSS assets can be requested, a functioning Incident Command Structure (ICS) with an identified Medical Branch will need to exist.

2. Depending upon local county emergency operational procedures, the Medical Branch can request REMSS assets through one of the following means:

   a. through the ICS to the county Emergency Operations Center (EOC) and Annex H – Health and Medical Representative (if EOC in operation)
   b. through direct contact with Regional Medical Emergency Response Center (MERC) in Regions 1,3,5,6,7,8 or the Regional Multiple Agency Coordination Center (MACC) in Regions 2, 4
   c. calling the Incident Resource Hotline at 1-800-800-2481 ("top down" method)

3. Any request for a REMSS team will need to be accompanied by:
   a. Specific number/types of ambulances and trailers needed (Who/What needs to go?)
   b. Reason for request (Why are they needed?)
   c. Expected mission for REMSS team (What will they do?)
   d. Staging location for REMSS team upon incident arrival (Where will they go?)
   e. Known scene or access to scene hazards (What hazards do they need to expect?)
   f. Contact name and phone number(s) for updates/requests for additional information (Who should be contacted during the REMSS response and upon arrival?)

Protocol 15B: Regional EMS System (REMSS) Activation Procedure:

Once a valid request, containing the above information, is received for REMSS deployment, the following sequence of actions occurs to effect the deployment:

1. Oklahoma State Office of Emergency Management (OEM) receives a call from the Incident Resource Hotline (1-800-800-2481) for REMSS assistance. An OEM representative will give the request to the Emergency Support Function 8 - Public Health and Medical Services (ESF-8) desk at the State Operations Center (Oklahoma State Department of Health) and notify the Regional Response Coordinator from the Oklahoma Office of Homeland Security.

2. ESF-8 personnel will contact MERC in regions 1,3,5,6,7,8, or the MACC in regions 2, 4 for validation.

3. MERC/MACC professionals will contact the Medical Branch at the scene to validate the request for assets. That contact will also include the affected county's Annex H Representative if the county EOC has been activated.

4. Once the request is validated, MERC/MACC will contact REMSS regional representative in affected region to determine ability of REMSS team to respond based upon the parameters of a validated request.

5. If a REMSS team can be formed from within the affected region, it will respond to the validated request.

6. MERC/MACC will notify state ESF-8 personnel and state Regional Response Coordinator of intra-regional response. ESF-8 will notify Oklahoma State Department of Health EMS Division and the County Health Administrator for the affected area.

7. If the REMSS team from the affected region is already engaged or otherwise unavailable, ESF-8 personnel will be notified and will contact the MERC/MACC in the adjoining region.

8. The next involved MERC/MACC will repeat the contacting process and determination of an available team.

9. Once a REMSS team able to respond from another region has been identified, ESF-8 personnel will be notified, and in conjunction with the state Regional Response Coordinator, will dispatch that REMSS team as an inter-regional response asset. ESF-8 personnel will make notifications to Oklahoma State Department of Health EMS Division.

PROTOCOL 15A: Multi-Patient Scenes/Mass Casualty Incident Concepts (cont.)

Communications Sector Tasks:

1. Start MCI log, using information from the Transportation Sector Officer.
2. Always designate a communications assistant to assure an organized flow of information from scene to hospital. Communications Sector tasks cannot be accurately managed by one individual.
3. Request additional ambulances needed through Medical Command.
4. As soon as a unit is ready to transport, advise EMS dispatch the ambulance unit ID and number/category/type of patients assigned (e.g. Medic 101 has 1/Red/Chest Injury and 1/Green/Ankle Injury). EMS dispatch will determine that unit's destination.
5. Inform crew of loaded ambulance of its destination, ensure its safe departure, and immediately request another ambulance to the loading zone from the staging area.
6. Establish communications with receiving hospital and inform emergency department personnel the ambulance unit ID and number/category/type of patients assigned (e.g. Medic 101 has 1/Red/Chest Injury and 1/Green/Ankle Injury).
7. Transporting units should not communicate directly with the receiving hospital unless the condition of the patient deteriorates and Medical Control contact is necessary for the management of the patient.

Staging Sector Tasks:

1. The Staging Sector Officer should coordinate an orderly arrangement of arriving apparatus to allow for ease of ambulance ingress to the transport loading zone.
2. The Staging Sector Officer or the officer's designee should maintain a log of available resources in staging and communicate with Medical Command resource levels as appropriate and as requested by Medical Command.
3. The Staging Sector Officer or the officer's designee should assure ambulance operators stay with their assigned vehicles to assure rapid availability of the ambulance when requested at the transport loading zone.
4. Deliver equipment needed in the treatment sector that is requested from staging in an organized cache with a minimum of personnel leaving the staging area to deliver this equipment. Alternatively, all the requested equipment may be sent to the treatment area on one designated vehicle.

15C – CHEMICAL WEAPONS

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Communication Center Principles:

911 calls present the first opportunity to identify that a potential weapon of mass destruction (WMD) - chemical incident exists. Identifying the incident, relaying potential threat information, and advising precautionary measures to ***all*** of the responding public safety professionals may be a key to saving lives of responding public safety professionals.

Indicators of a Possible Chemical Weapons Incident:

1. Explosion with little or no structural damage;
2. Reports of a device that dispersed a mist or vapor;
3. Multiple casualties exhibiting similar symptoms (may be without apparent reason);
4. Reports of unusual odors, liquids, spray devices, or cylinders;
5. Dead animals;
6. Discarded personal protective equipment (PPE).

Potential Notifications (actual notification needed if chemical weapon event confirmed):

1. Local Law Enforcement
2. Local Federal Bureau of Investigation (FBI) office – WMD Coordinator;
3. Local/State Office of Emergency Management (OEM);
4. Local Health Department

Initial Actions/On – Scene Arrival:

1. Approach upwind and uphill of the incident;
2. Stop at an apparent safe distance away from incident location;
3. Alert subsequent arriving responders;
4. Direct all personnel to use full PPE, including self-contained breathing apparatus (SCBA)
    a. At a minimum, respiratory protection;
5. Be aware of possible secondary devices;
6. Treat as a crime scene/Consider that alleged perpetrator may still be on the scene;
7. Avoid contact with liquids;
8. Request appropriate resources (HazMat specialists, law enforcement officers, etc.)

PROTOCOL 15C: Chemical Weapons, cont.:

Establishing Incident Command: (Follow Specific Directives of Incident Commander)

Follow National Incident Management System (NIMS) practices as reflected in local policies.
Utilize a Unified Command structure, promoting effective and efficient multi-agency communications and operations.
Further information through NIMS courses can be accessed at this website:
http://www.fema.gov/emergency/nims/NIMSTrainingCourses.shtm#item1

Casualty Rescue: (Follow Specific Directives of Incident Commander)

As many ambulatory casualties as possible should be removed from the area without rescuers entering the incident site. It should be expected, though, that live, non-ambulatory casualties will be present at any chemical incident.

1. Use bull horns and vehicle public address (PA) system to give directions;
2. Be alert for secondary devices;
3. Determine if there are live victims in the contaminated area;
4. Use PPE appropriate for safe rescue – PPE level most likely determined by HazMat specialists advising the Incident Commander (IC). The IC evaluates the chemical threat, potential to save lives, risk to responders, and time constraints to achieve each level of responder protection before determining what level of PPE to use to perform rescue operations;
5. When safe and appropriate, assist/direct all victims to decontamination and triage area.

Decontamination: (Follow Specific Directives of Incident Commander)

The theories and procedures referred to by the Chemical Weapons Improved Response Program (CWIRP) are based on decontaminating victims using large volumes of water.

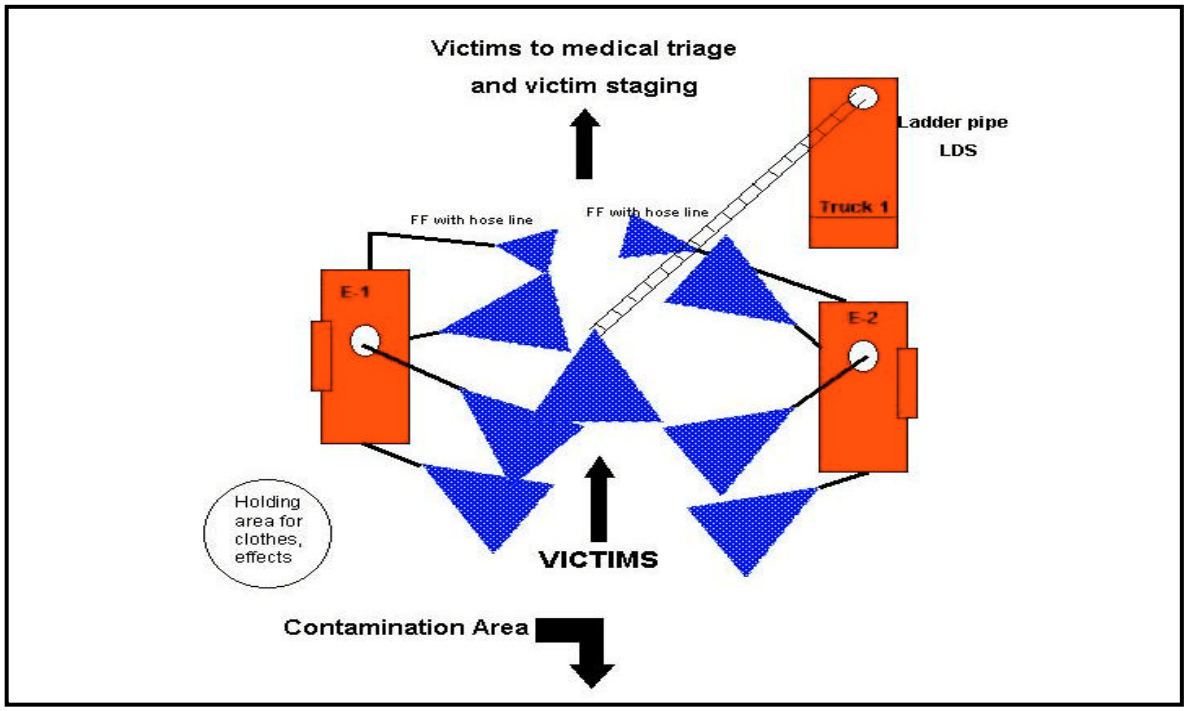
Establish decontamination location(s) upwind and uphill of the incident:

1. Decontamination personnel must wear appropriate PPE, likely to include SCBA.
2. Be alert for secondary devices, weapons, and perpetrators:
3. Avoid contact with unknown liquids.
4. Decontaminate **(immediately)** casualties with liquid contamination on their skin or clothing.
5. Clothing removal is often the most effective decontamination. Encourage victims to remove clothing at least down to their undergarments;
6. Prioritize asymptomatic, symptomatic, and non-ambulatory casualties:
    a. Coordinate decontamination with EMS triage activities.
    b. Establish separate technical decontamination for responders away from mass-casualty decontamination.

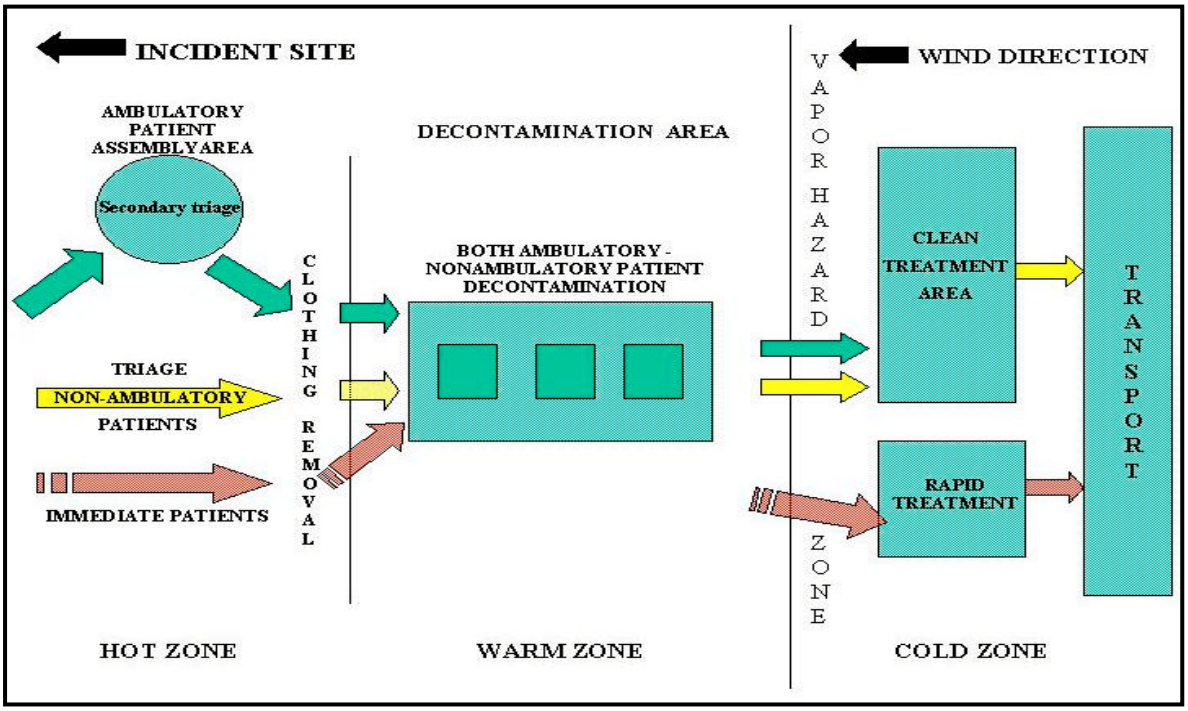
The diagrams on the following page are provided to illustrate commonly recognized methods of mass “wet” decontamination. Follow the directives of the Incident Commander and HazMat specialists in charge of decontamination.

PROTOCOL 15C: Chemical Weapons, cont.:

LADDER PIPE DECONTAMINATION SYSTEM (LDS)



EMERGENCY DECONTAMINATION CORRIDOR SYSTEM (EDCS)



Protocol 15C: Chemical Weapons, cont.:

Types of Decontamination:

a. Passive (clothing removal) – often the simplest and effective method
b. Dry agents
    i. Dirt - Flour
    ii. Baking powder - Sawdust
    iii. Charcoal - Silica gel
c. Wet agents
    i. Soap and water
    ii. Water (only)
    iii. Bleach (for equipment decontamination)
d. Air decontamination (positive pressure ventilation [PPV]/portable fans)

<u>EMS Principles</u>: (Follow Specific Directives of Incident Commander)

One of the primary challenges facing EMS on a chemical weapons incident will be the number of casualties (eg. trauma and agent exposure) and segregating these casualties by severity of illness/injury as well as attempting to segregate the "worried well" from actual exposed victims.

Work with appropriate HazMat specialists to determine proper level of PPE and respiratory protection needed for EMS personnel and what areas are appropriate for EMS care activities.

a. Be alert for secondary devices and perpetrators;
b. Avoid contact with liquids other than non-contaminated water;
c. Rapid prioritization of number of patients;
d. Triage victims based on medical necessity, using MCI protocols;
e. Establish patient identification and tracking.
f. Establish:
    i. Communications with command post and hospitals;
    ii. Staging for EMS personnel, ambulances, supplies, and resources;
    iii. Transportation area – avoid transporting any contaminated patient(s).

15D – CHEMPACK DEPLOYMENT ACTIVATION PROCEDURE

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

If an incident appears to have the possibility of a nerve agent, organophosphate or radiological incident, the Incident Commander on the scene should notify the Oklahoma Poison Control Center (OPCC).

To contact the Oklahoma Poison Control Center in Oklahoma City:

Healthcare Professional Access Number: 1-877-271-6998

When calling, identify yourself by name, EMS certification level, and agency/apparatus identification. Have as much patient information and substance information possible (may be limited in early phase of potential mass casualty incident) readily available to share with the poison center specialist.

Based on the outcome of the call, if it is a plausible chemical or radiological event, OPCC will activate the nearest CHEMPACK site and notify the appropriate Regional Medical Emergency Response Center (MERC) (also referred to as the Regional CHEMPACK Coordinator).

The Regional CHEMPACK Coordinator will assume coordination and determine additional support facilities, transport modes if needed (coordinating with local Emergency Management, medical facilities, the nearest CHEMPACK site and Oklahoma Highway Patrol), and contact the facilities to determine their level.

The selected site(s) can be placed on three (3) different levels: *Standby* - Level 1, *Alert* - Level 2 and *Activation* - Level 3. During *Activation* - Level 3, the cache site will open the container and access the material. If pre-defined at the time of container receipt from the CDC, the container contents will be separated and prepared for delivery to hospital emergency departments and/or EMS.

CHEMPACK assets are to be utilized as a second line of defense. It is expected that existing supplies of nerve agent antidotes will be utilized before opening CHEMPACK containers unless EMS and/or hospitals anticipate exhausting their existing cache of these agents, at which time CHEMPACK containers may be opened.

15E NERVE AGENTS

EMERGENCY MEDICAL DISPATCH
EMERGENCY MEDICAL RESPONDER
EMT-BASIC
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

NERVE AGENT EXPOSURES

Comments

1. Nerve agent exposure should be considered at multiple causality incidents in which patients are exhibiting the DUMBELS constellation of symptoms and signs. In particular, nerve agent exposure should be considered while responding to any reports of multiple casualties at a location of high occupancy (should malls, stadiums, etc), high visibility (crowds gathered for public speeches, protests, etc), or high political symbolism (places of worship, governmental offices, etc).
2. Immediate countermeasures to nerve agent exposure with developing DUMBELS symptoms and signs are administration of the DuoDote auto-injectors, auto-injector-as indicated and evacuation from the exposure are for decontamination.
3. Any personnel exposed to a nerve agent and requiring treatment with the DuoDote auto-injectors is restricted from providing patient care and should be promptly transported for emergency physician evaluation.
4. Atropine is utilized in nerve agent exposure treatment to dry secretions, reduce bronchospasm, and decrease gastrointestinal motility. If significant bronchorrhea continues after three DuoDote auto-injector have been administered in the adult patient, further atropine may be given as follows until the brochorrhea subsides:

   Adult – 1 mg atropine IVP every 3-5 minutes
   Adult – 2 mg atropine IM every 5 minutes

5. In the case of nerve agent exposure with bronchorhea, there is no maximum atropine dosing in the adult patient, though atropine should withheld in the case of developing ventricular tachydysrhythmias. In this case, treat the ventricular tachydysrhythmia according to 5G Tachycardia – Unstable – Adult & Pediatric or 4G Ventricular Fibrillation/Pulseless Ventricular Tachycardia – Adult & Pediatric as applicable.

PROTOCOL 15E: Nerve Agents, cont.

6. DuoDote is utilized in nerve agent exposure to reverse the nerve agent effect on acetylcholinesterase, the enzyme responsible for neurotransmitter regulation.

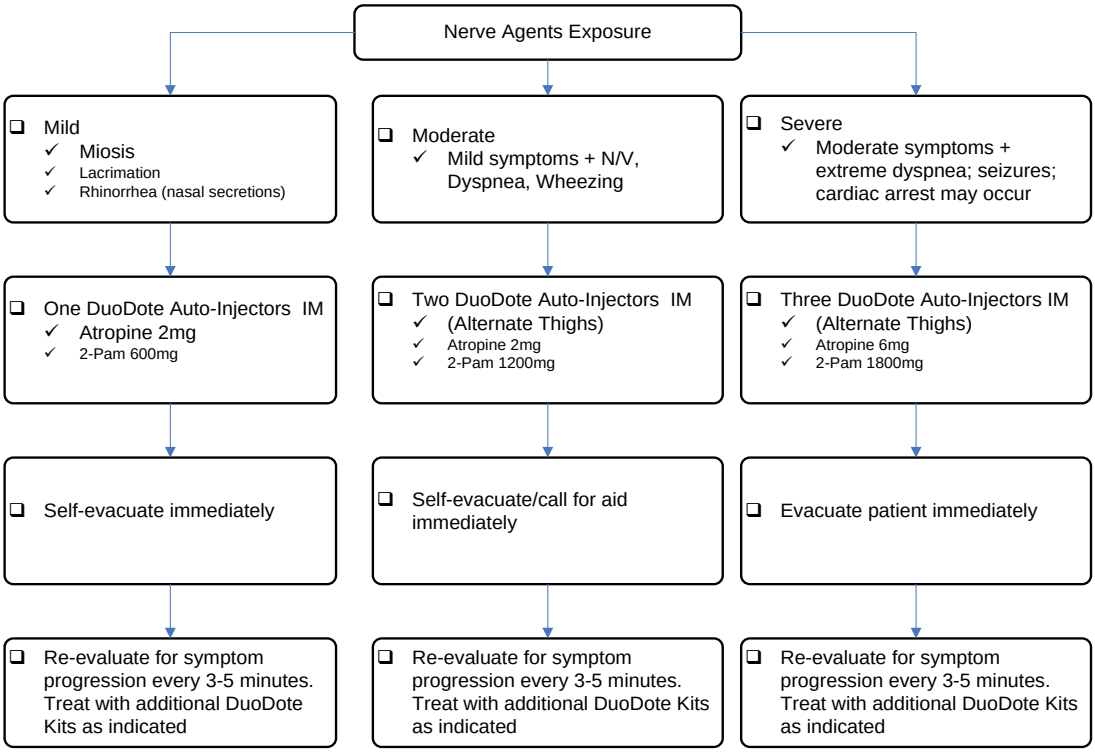
7. Patients contaminated by vapor-only nerve agent exposures should be decontaminated by clothing removal (dry decon). Patients contaminated by liquid nerve agent exposures should be decontaminated by clothing removal and thoroughly washed with soap and water (wet decon).

8. In the absence of DUMBELS symptoms and signs, nerve agent exposure has not occurred. The DuoDote auto-injectors are not authorized for patients not exhibiting DUMBELS symptoms and signs.

9. Pediatric patients (<25 kg) with DUMBELS symptoms and signs in the setting of suspected nerve agent exposures should be treated with one DuoDote auto-injector kit and OLMCP should be contacted for further direction in relation to any further atropine and/or 2-PAM usage.

10. Patients treated with DuoDote auto-injector kits should either have the auto-injector hooked to their clothing or a prominent vertical mark on their forehead for each kit administered to indicate to further healthcare providers the number of DuoDote auto-injector kits the patient has received.

PROTOCOL 15E: Nerve Agents, cont.



LOOK FOR "DUMBELS" SIGNS AND SYMPTOMS

D: DIARRHEA
U: URINATION
M: MIOSIS (PINPOINT PUPILS)
B: BRONCHOSPASM, BRONCHORRHEA (COPIOUS RESPIRATORY SECRETIONS)
E: EMESIS (NAUSEA/VOMITING)
L: LACRIMATION (TEARING)
S: SALIVATION

15F – BIOLOGICAL WEAPONS

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

While a multitude of biological agents exist that have possibility in weapon use, the Centers for Disease Control categorizes these agents into priority of concern and probable use. Category A agents include organisms that pose a risk to national security due to easy dissemination or person to person transmission, high mortality rates, high impact upon public health, ability to cause public panic and social disruption, and require special action for public health preparedness.

Category A agents and their diseases include:

Bacillus anthracis – Anthrax
Clostridium botulinum toxin – Botulism
Yersinia pestis – Plague
variola major – Smallpox
Francisella tularensis – Tularemia
filoviruses (eg. Ebola, Marburg); arenaviruses (eg. Lassa, Machupo) – Viral hemorrhagic fevers

Of particular concern among these agents is anthrax. While anthrax is a naturally occurring disease among animal skin handlers, the bacteria has already been successfully used in domestic terrorism in the United States. Concern about anthrax prompts responses by public safety agencies, including EMS in some locales, to investigate these concerns and in some cases, acute onset of symptoms, in response to exposure to “suspicious white powder”. The following information serves as one resource in preplanning responses to such substances in efforts to protect EMS and other safety professionals.

Additional resources regarding biologic weapons can primarily be accessed through the Centers for Disease Control at www.bt.cdc.gov/bioterrorism.

PROTOCOL 15F: Biological Weapons, cont.

Suspicous Powder Response Model Procedure – Follow Local HazMat Directives

Definitions:

Isolation Perimeter – The designated crowd control line surrounding the Hazard Control Zones. The isolation perimeter is always the line between the general public and the Cold Zone.

Field Test – A procedure that will be determined by on-scene FD Hazmat and PD personnel to check the presence of radiological, biological, chemical, and volatility (flammability) in or around a package.

ID Test – FD procedure to obtain information to identify a specific substance (i.e., salt, sugar, flour, etc) or chemical compound. Testing to identify a substance is more geared toward dry product or liquids without water content. The test signature of water overrides/masks the graph spikes preventing identification.

Procedures:

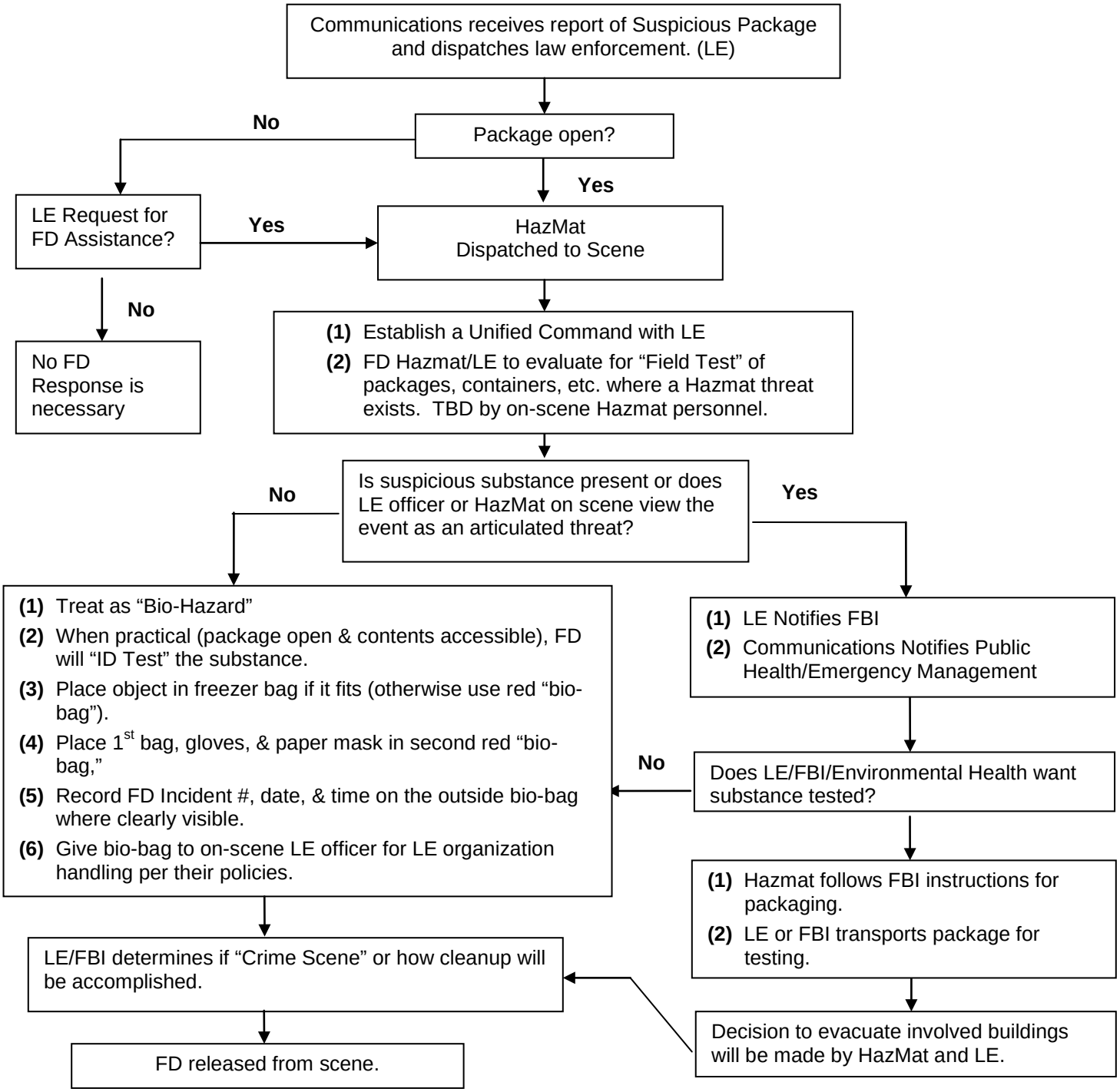
The following actions should be taken at incidents involving a package suspicious for anthrax:

1. Once law enforcement (LE) arrives on scene and decides that FD is needed, HazMat resource mobilization should be considered.
2. If the first arriving FD company is not a Hazmat Unit and receives information that the incident may be a potential chemical or biological threat, the OIC should:
    a. Not make entry or attempt to mitigate the incident
    b. Establish an isolation perimeter of at least 100 feet
    c. Should keep all citizens on the outside of the isolation perimeter
    d. Call for the Hazmat Team
    e. Wait upwind until arrival of Hazmat Team
    f. Operate in a support role for the Hazmat Team upon their arrival
3. The Hazardous Materials Team OIC will be either Command or Hazmat Branch as appropriate.

PROTOCOL 15F: Suspicious Power Response Procedure, cont.

Suspicious Power Response Procedure, cont.

Suspicious Package Flowchart



15G – RADIOLOGICAL WEAPONS

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

1. Potential radiologic weapon devices in the United States include:
    a. Simple radiation emitting devices (example would be dumping radioactive waste in a water supply – typically NOT a significant threat due to dilution effect of large amount of water)
    b. Conventional explosive device containing radiation ("dirty bomb") – typically NOT a significant threat due to the fact that explosions are very inefficient in producing radioactive particles of a size that are easily inhaled

2. Either of the above devices may be utilizing radioactive isotopes initially manufactured for medical use (eg. nuclear imaging).

3. Radiation types include the following:
    a. Irradiation = gamma radiation passing through a body
    b. External contamination = radioactive "dust" particles falling on a body
    c. Internal contamination = radioactive "dust" particles being ingested or inhaled

4. Protection takes the simple format of:
    a. Reducing time of exposure
    b. Increasing distance from exposure source – biggest factor in protection. Radiation does not travel far, but contamination can.
    c. Shielding device use to minimize exposure uptake. Airborne illness PPE protection is excellent for radiation protection as well). Think of radioactive particles as "dirt" that shouldn't be inhaled (wear N95 masks) and shouldn't be in contact with skin.

5. Three **myths** that can paralyze medical response:
    a. "Radioactive contamination is highly dangerous & requires extraordinary protective measures." (see above)
    b. "Decon is highest medical priority." Decon is actual very simple = remove clothing and shower. Most of radiation goes away with removal of clothing.
    c. "Special skills are needed to handle radioactive patients." (see above)

15H – NUCLEAR WEAPONS

EMERGENCY MEDICAL DISPATCHER
EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

1. Potential nuclear weapon devices impacting the United States include:
    a. Improvised nuclear device.
    b. 1 kiloTon "suitcase nuke."
    c. Tactical weapons of 5-50 kiloTons.
    d. Electromagnetic pulse detonation = nuclear weapon detonation in atmosphere wherein gamma waves hit radio waves, causing phones, pagers, radios, etc go down.
    e. Ballistic missile attack.
    f. 250 kiloTon nuclear bomb = "city killer."

2. Nuclear detonation = 50% blast effect; 35% thermal effect; 10% fallout; 5% ionizing radiation effect.

3. Mass blindness is a concern due to retinal burns (non-thermal) from viewing detonation.

4. Radiation types include the following:
    a. Irradiation = gamma radiation passing through a body.
    b. External contamination = radioactive "dust" particles falling on a body.
    c. Internal contamination = radioactive "dust" particles being ingested or inhaled.
5. Protection takes the simple format of:
    a. Reducing time of exposure.
    b. Increasing distance from exposure source – biggest factor in protection. Radiation does not travel far, but contamination can.
    c. Shielding device use to minimize exposure uptake. Airborne illness PPE protection is excellent for radiation protection as well). Think of radioactive particles as "dirt" that shouldn't be inhaled (wear N95 masks) and shouldn't be in contact with skin.

PROTOCOL 15H: Nuclear Weapons, cont.

6. Three **myths** that can paralyze medical response:
    a. "Radioactive contamination is highly dangerous & requires extraordinary protective measures." (see above)
    b. "Decon is highest medical priority." Decon is actual very simple = remove clothing and shower. Most of radiation goes away with removal of clothing.
    c. "Special skills are needed to handle radioactive patients." (see above)

7. Multiple resources exist to aid in the understanding and response planning for nuclear weapons. The following are suggested resources:

   Radiation Emergency Medical Management
   www.remm.nlm.gov

   National Alliance for Radiation Readiness (NARR)
   www.radiationready.org

   Nuclear Regulatory Commission
   www.nrc.gov

   Society of Nuclear Medicine and Molecular Imaging
   www.snm.org

   Health Physics Society
   www.hps.org

   Planning Guidance for Response to a Nuclear Detonation June 2010 – Second Edition
   www.hps.org/hsc/documents/Planning_Guidance_for_Response_to_a_Nuclear_Detonation-2nd_Edition_FINAL.pdf

   National Disaster Life Support training
   Basic Disaster Life Support (one day classroom course)
   Advanced Disaster Life Support (two day classroom/practical exercise course)
   Courses are available statewide through OU Department of Emergency Medicine
   www.oudem.org/oklahoma-disaster-institute/national-disaster-life-support.cfm

Special acknowledgement to John C. White, CNMT, Radiation Safety Officer, The University of Texas Southwestern Medical Center at Dallas for material integral to this protocol's preparation.

PROTOCOL 15G: Radiological Weapons, cont.

6. Multiple resources exist to aid in the understanding and response planning for radiological weapons. The following are suggested resources:

   Radiation Emergency Medical Management
   www.remm.nlm.gov

   National Alliance for Radiation Readiness (NARR)
   www.radiationready.org

   Society of Nuclear Medicine and Molecular Imaging
   www.snm.org

   Health Physics Society
   www.hps.org

   National Disaster Life Support training
   - Basic Disaster Life Support (one day classroom course)
   - Advanced Disaster Life Support (two day classroom/practical exercise course)
   - Courses are available statewide through OU Department of Emergency Medicine
   - www.oudem.org/oklahoma-disaster-institute/national-disaster-life-support.cfm

Special acknowledgement to John C. White, CNMT, Radiation Safety Officer, The University of Texas Southwestern Medical Center at Dallas for material integral to this protocol's preparation.

Oklahoma State
Department of Health

SECTION 16

FORMULARY

16A – ALBUTEROL (PROVENTIL®, VENTOLIN®)

EMERGENCY MEDICAL DISPATCHER	Self-Administration Phone Directive - 3B 3C 3D 12B
EMERGENCY MEDICAL RESPONDER	Assist Pt with Self Administration - 3B 3C 3D 12B
EMT	
EMT-INTERMEDIATE 85	
ADVANCED EMT	
PARAMEDIC	

Class: Sympathomimetic Bronchodilator

Actions/Pharmacodynamics: Albuterol is a relatively selective $beta_2$ adrenergic stimulant. Albuterol causes relaxation of the smooth muscles of the bronchial tree thus decreasing airway resistance, facilitating mucus drainage, and increasing vital capacity. It exerts mild effects on $beta_1$ (heart) or alpha (peripheral vasculature) receptors. In therapeutic doses, albuterol, by inhibiting histamine release from mast cells, also reduces the mucus secretion, capillary leaking, and mucosal edema caused by an allergic response in the lungs.

Indications: Dyspnea - Uncertain Etiology (3B)
Dyspnea - Asthma (3C)
Dyspnea - Chronic Obstructive Pulmonary Disease (3D)
Acute Allergic Reactions (8D)
Bee/Wasp Stings (8F)
Smoke Inhalation (12B)

Contraindications: Known hypersensitivity to albuterol. Albuterol should not be used if the sole etiology of dyspnea is strongly suspected to be CHF, as albuterol-induced tachycardia may worsen the compromised cardiac output in CHF.

Pharmacokinetics: Onset within 5 – 15 minutes; peak effect in 1 – 1.5 hours; duration of effect is up to 3 – 6 hours; half – life is less than 3 hours. Distribution: When inhaled, albuterol is distributed to muscle cells along the bronchial tree. Very little is systemically absorbed and distributed.

Side Effects: Tremors, anxiety, dizziness, headache, cough, reflex bronchospasm, palpitations, tachycardia, and hypertension.

PROTOCOL 16A: Albuterol (Proventil®, Ventolin®)

Dosage:

Dyspnea - Uncertain Etiology - Adult & Pediatric Weight ≥ 15kg (3B)
Smoke Inhalation - Adult & Pediatric Weight ≥ 15kg (12B)
5mg nebulized, may repeat once

Dyspnea - Uncertain Etiology - Pediatric Weight < 15kg (3B)
Smoke Inhalation - Pediatric Weight < 15kg (12B)
2.5mg nebulized, may repeat once

Dyspnea - Asthma - Adult & Pediatric Weight ≥ 15kg (3C)
Dyspnea - Chronic Obstructive Pulmonary Disease - Adult (3D)
Acute Allergic Reactions - Adult & Pediatric Weight ≥ 15kg (8D)
Bee/Wasp Stings - Adult & Pediatric Weight ≥ 15kg (8F)
5mg nebulized (with ipratropium bromide 0.5mg), may repeat twice

Dyspnea - Asthma - Pediatric Weight < 15kg (3C)
Acute Allergic Reactions - Pediatric Weight < 15kg (8D)
Bee/Wasp Stings - Pediatric Weight < 15kg (8F)
2.5mg nebulized (with ipratropium bromide 0.25mg), may repeat twice

How Supplied: 2.5 mg/ 3 mL (0.083%) in nebulizer vials.
(Always check concentration and dose per container at time of patient medication administration)

16B – ASPIRIN

EMERGENCY MEDICAL DISPATCHER	Self-Administration Phone Directive - 5A 5C
EMERGENCY MEDICAL RESPONDER	Assist Pt with Self Administration - 5A 5C
EMT	
EMT-INTERMEDIATE 85	
ADVANCED EMT	
PARAMEDIC	

Class: Anti-Platelet

Actions/Pharmacodynamics: Inhibits platelet aggregation (and thereby, further clot formation). This action results in an overall increase in survival from acute myocardial infarction.

Indications: Chest Pain - Uncertain Etiology (5A)
Acute Coronary Syndrome (5C)

Contraindications: Active gastrointestinal bleeding
History of aspirin allergy including angioedema and/or anaphylaxis
History of asthma with aspirin-induced exacerbation

Pharmacokinetics: Absorption in stomach and small intestine, with onset of action within 30 minutes and duration of action for several hours.

Side Effects: Typically none from single EMS dosing. Rare instances of nausea or allergic reaction could be encountered. Treat allergic reaction per Protocol 8D - Acute Allergic Reactions.

Dosage: **Chest Pain - Uncertain Etiology - Adult (5A)**
Acute Coronary Syndrome - Adult (5C)
324 OR 325 mg chewed by patient (hold if taken 324+mg within 6 hours)

How Supplied: 81mg tablets
325mg tablets
(Always check concentration and dose per container at time of patient medication administration)

Special Comment: Aspirin is indicated even if the patient is taking warfarin sodium (Coumadin®), clopidogrel (Plavix®), or other anticoagulant or antiplatelet agents on a daily basis.

16C – DUODOTE® AUTOINJECTOR

EMERGENCY MEDICAL RESPONDER

EMT

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

Class: Parasympatholytic & Cholinesterase Reactivator

Actions/Pharmacodynamics:

Atropine Blocks parasympathetic impulses to the heart via the vagus nerve. Atropine increases the rate of cardiac sinoatrial (SA) node discharges, enhances conduction through the atrioventricular (AV) node, and by increasing heart rate, increases the cardiac output and blood pressure. Additionally, in the treatment of indicated poisonings (organophosphates, nerve agents), atropine reverses muscarinic effects of acetylcholine, including diaphoresis, diarrhea, urination, bronchorrhea (secretions from the lower respiratory tract), emesis, lacrimation (tearing), and salivation. Atropine produces dilation of pupils by blocking stimulation of the ciliary muscle surrounding the pupils.

Pralidoxime chloride reactivates cholinesterase (mainly outside the central nervous system) which has been inactivated by an organophosphate pesticide. The destruction of accumulated acetylcholine can then proceed and neuromuscular junctions will regain function. Pralidoxime chloride has its most critical effect in reversing paralysis of the muscles of respiration. Because Pralidoxime Chloride is less effective in relieving depression of the respiratory center, atropine is always required concomitantly to block the effect of accumulated acetylcholine at the site. Pralidoxime Chloride is short acting and repeated doses may be needed, especially when there is evidence of continuing toxicity.

Indications: Nerve Agents (15E)

Contraindications: None

Pharmacokinetics: With IM autoinjector use in nerve agent poisoning, effects may not be observed for 3-5+ minutes. Beneficial effects can persist in excess of 1 hour.

Side Effects: Headache, dizziness, vision changes (blurry vision and photophobia) due to papillary dilation, loss of coordination, laryngospam, tachycardia, hypertension, palpitations, dry mouth.

PROTOCOL 16C: DuoDote® Autoinjector, cont.

Dosage: **Nerve Agents - Adult & Pediatric > 12 years of age (15E)**
2.1 mg atropine/ 600 mg pralidoxime IM
May repeat every 5-15 minutes to cumulative maximum dose of 6.3 mg/1800 mg. In the setting of serious symptoms (cardiopulmonary distress), repeat doses in rapid succession.

Nerve Agents - Pediatric ≤ 12 years of age (15E)
****OLMC Order Only**
Typical pediatric dose is 0.05 mg/kg atropine & 15 mg/kg pralidoxime IM per dose, max single dose of 2.1mg atropine/600 mg pralidoxime

How Supplied: DuoDote® autoinjector
(Always check concentration and dose per container at time of patient medication administration)

Special Comments: Ideally, every public safety professional should have ready access to three DuoDote® autoinjectors for self/buddy use should emergent conditions warrant. In the setting of suspected/actual nerve agent exposure, administration of the DuoDote® autoinjector(s) must occur within minutes of exposure for clinically effective results.

16D – EPINEPHRINE AUTOINJECTOR (EPIPEN®, TWINJECT®)

EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Class: Vasoconstrictor, Bronchodilator (Catecholamine)

Actions/Pharmacodynamics: Stimulates alpha receptors in the peripheral vasculature, producing vasoconstriction-related increases in systemic blood pressure. Stimulates beta-1 receptors in the myocardium, producing increases in heart rate, myocardial contraction, and as a result, cardiac output. Stimulates beta-2 receptors in the lower respiratory tract smooth musculature, producing bronchodilation.

Indications: Dyspnea - Asthma (Severe - Refractory to Inhaler/Nebulization) (3C)
Acute Allergic Reactions (Anaphylaxis) (8D)
Snakebites (Anaphylaxis) (8E)
Bee/Wasp Stings (Anaphylaxis) (8F)

Contraindications: None in indications above.

Pharmacokinetics: Onset of action within 5-10 minutes after IM administration. Duration of effect may range upwards of 30 minutes intramuscularly.

Adverse/Side Effects: Restlessness, anxiety, generalized tremors, headache, dizziness, chest pain, palpitations, hypertension, premature ventricular contractions, tachycardia. Pulsatile patients ages 35 years or greater, particularly those with known coronary artery disease, receiving epinephrine should have ECG monitoring initiated and continued as soon as an ECG monitor is available. Safety in pregnancy not firmly established, though when clinically indicated the benefits outweigh risks and should not deter clinically necessary usage.

Dosage: **Dyspnea - Asthma (Severe - Refractory to Inhaler/Nebulization) - Adult (3C)**
Acute Allergic Reactions (Anaphylaxis) - Adult (8D)
Snakebites (Anaphylaxis) - Adult (8E)
Bee/Wasp Stings (Anaphylaxis) - Adult (8F)
Adult Epinephrine Autoinjector (0.3 mg of Epinephrine 1:1000) IM lateral thigh

****OLMC Order required if pt ≥ 50 years old, heart illness history, or blood pressure > 140/90 mmHg.**

PROTOCOL 16D: Epinephrine Autoinjector (EpiPen®, Twinject®)

Dosage, cont.:

Dyspnea- Asthma (Severe-Refractory to Inhaler/Nebulization)-Pediatric (3C)
Acute Allergic Reactions (Anaphylaxis) - Pediatric (8D)
Snakebites (Anaphylaxis) - Pediatric (8E)
Bee/Wasp Stings (Anaphylaxis) - Pediatric (8F)
Pediatric Epinephrine Autoinjector (0.15 mg of Epinephrine 1:1000) IM lateral thigh

****OLMC Order required if heart illness history or blood pressure > 140/90 mmHg.**

How Supplied: 0.3 mg Adult Epinephrine Autoinjector
(EpiPen® one dose per autoinjector; Twinject® two doses per autoinjector)

0.15 mg Pediatric Epinephrine Autoinjector
(EpiPen® Jr. one dose per autoinjector, Twinject® two doses per autoinjector)

(Always check concentration and dose per container at time of patient medication administration)

Special Comment: For autoinjector medication administration, expose and wipe the mid-lateral thigh with ChloraPrep®, Betadine®, or an alcohol wipe. When handling the autoinjector for dosing, grasp the autoinjector with a fist, and remove the trigger safety cap. DO NOT place fingers or hand over the injection tip once the trigger safety cap is being removed.

Place the injection tip on the desired injection skin area and push the entire autoinjector into the thigh, using firm and continuous pressure, until a click is heard (patient will exhibit evidence of feeling spring-loaded needle activation) and hold in place for 10 seconds while medication is being delivered intramuscular.

Use caution when withdrawing the autoinjector to avoid needlestick injury. Dispose of whole autoinjector in a sharps container.

16E – GLUCOSE (ORAL)

EMERGENCY MEDICAL RESPONDER
EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Class: Carbohydrate

Actions/Pharmacodynamics: Increases blood sugar level.

Indications: Altered Mental Status (Hypoglycemia) (6B)
Syncope (Hypoglycemia) (6E)
Dystonic Reaction (Hypoglycemia) (6F)
Behavioral Disorder (Hypoglycemia) (7A)
Dialysis-Related Issues (Hypoglycemia) (9E)
Complications of Pregnancy (Hypoglycemia) (13D)

Contraindications: Unconscious or semi–conscious and unable to follow simple commands. Care should be taken to prevent choking or aspiration of medication in semi–conscious patient.

Pharmacokinetics: Rapid oral absorption uptake to increase circulating blood sugar levels. Onset of effect within several minutes of oral dosing. Duration of effect up to 30+ minutes, but patient should be advised to consume complex carbohydrates within minutes of restoration of normal blood sugar, unless otherwise contraindicated.

Side Effects: None

Dosage: **Altered Mental Status (Hypoglycemia) - Adult & Pediatric Weight ≥ 25 kg (6B)**
Syncope (Hypoglycemia) - Adult & Pediatric Weight ≥ 25 kg (6E)
Dystonic Reaction (Hypoglycemia) - Adult & Pediatric Weight ≥ 25 kg (6F)
Behavioral Disorder (Hypoglycemia) - Adult & Pediatric Weight ≥ 25 kg (7A)
Dialysis-Related Issues (Hypoglycemia) - Adult & Pediatric Weight ≥ 25 kg (9E)
Complications of Pregnancy (Hypoglycemia) - Adult (13D)
15 grams (1 tube) PO or SL for blood glucose < 50 mg/dL

PROTOCOL16E: Glucose (Oral), cont.

Dosage, cont.

Altered Mental Status (Hypoglycemia) - Pediatric Weight < 25 kg (6B)
Syncope (Hypoglycemia) - Pediatric Weight < 25 kg (6E)
Dystonic Reaction (Hypoglycemia) - Pediatric Weight < 25 kg (6F)
Behavioral Disorder (Hypoglycemia) - Pediatric Weight < 25 kg (7A)
Dialysis-Related Issues (Hypoglycemia) - Pediatric Weight < 25 kg (9E)
7.5 grams (1/2 tube) PO or SL for blood glucose < 50 mg/dL

How Supplied: 15 grams of glucose for oral administration in a squeeze tube container. (Always check concentration and dose per container at time of patient medication administration)

Special Comment: Medical grade glucose should be utilized in place of sodas, candy, and other carbohydrate-heavy solid food. In many cases, the carbohydrate grams cannot be measured.

16F – NITROGLYCERIN (NITROLINGUAL®, NITROMIST®, NITROSTAT®, NITROQUICK®, TRIDIL (IV INFUSION), NITRO-BID® - DERMAL)

EMERGENCY MEDICAL DISPATCHER	Sublingual Dosing - Own Self-Administration Phone Directive - 3E 5A 5C
EMERGENCY MEDICAL RESPONDER	Sublingual Dosing - Assist Pt with Own Self-Administration - 3E 5A 5C
EMT	Sublingual Dosing - Assist Pt with Own Self-Administration - 3E 5A 5C
EMT-INTERMEDIATE 85	Sublingual Dosing - Assist Pt with Own Self-Administration - 3E 5A 5C
ADVANCED EMT	Sublingual Dosing - Assist Pt with Own Self-Administration - 3E 5A 5C
PARAMEDIC	

Class: Anti-Anginal, Vasodilator, Anti-Hypertensive (Nitrate)

Actions/Pharmacodynamics: Arterial and venous vasodilator through relaxing vascular smooth muscle. Reduces cardiac afterload resistance and cardiac preload volume respectively. Myocardial oxygen consumption/demand is decreased. Systemic blood pressure is decreased.

Indications: Dyspnea - Congestive Heart Failure (3E)
Chest Pain - Uncertain Etiology (5A)
Acute Coronary Syndrome (5C)
Hypertensive Emergency (5L)
Complications of Pregnancy (Hypertensive Emergency) (13D)

Contraindications: Hypotension
Asymptomatic Hypertension
Erectile Dysfunction Medications **(**Requires OLMC Order Only)**
Sildenafil (Viagra®) or Vardenafil (Levitra®) use within 24 hours
Tadafil (Cialis®) use within 48 hours

Pharmacokinetics: Rapid vascular uptake within 3 minutes of sublingual dosing, with duration of effect up to 30 minutes. Rapid vascular effect within 1-3 minutes of intravenous dosing, with ongoing effect while continuous infusion.Vascular effect within 15-30 minutes of transdermal dosing, with ongoing effect while continued transdermal absorption.

Side Effects: The most serious side effect is hypotension, usually transient and responsive to supine positioning and intravenous fluid bolusing. Common, though non-serious, symptoms include:headache due to vasodilation, blurred vision, and dizziness. Paramedics should exercise caution when applying transdermal nitroglycerin ointment, avoiding contact with bare hands to avoid experiencing personal side effects, typically headache and dizziness.

PROTOCOL 16F: Nitroglycerin (Nitrolingual®, NitroMist®, NitroStat®, NitroQuick®, Tridil - Intravenous, Nitro-BID® - Transdermal), cont.

Dosage: **Dyspnea - Congestive Heart Failure - Adult (3E)**
Acute Coronary Syndrome - Adult (5C)
0.4 mg sublingual spray or tablet if systolic BP > 100 mmHg. Single dose unless by Paramedic. May repeat 0.4 mg sublingual spray or tablet every 5 minutes if systolic BP >100 mmHg until chest pain and/or respiratory distress resolves.

Following initial sublingual use, may utilize intravenous infusion start at 10 mcg/min, titrate slowly to effect. Maximum infusion rate without OLMC consult is 50 mcg/min.

Following initial sublingual use, may utilize transdermal application of 1 inch ointment to chest wall.

Chest Pain - Uncertain Etiology - Adult (5A)
0.4 mg sublingual spray or tablet if systolic BP >100 mmHg. Single dose unless by Paramedic. If chest pain improved with initial dose, 0.4 mg sublingual spray or tablet every 5 minutes until chest pain and/or respiratory distress resolves.

Following initial sublingual use, may utilize intravenous infusion start at 10 mcg/min, titrate slowly to effect. Maximum infusion rate without OLMC consult is 50 mcg/min.

Following initial sublingual use, may utilize transdermal application of 1 inch ointment to chest wall.

Hypertensive Emergency - Adult (5L)
Complications of Pregnancy (Hypertensive Emergency) - Adult (13D)
0.4mg sublingual spray or tablet every 5 minutes until BP symptoms resolve or BP is reduced by 10%.

In place of or following initial sublingual use, may utilize intravenous infusion start at 10 mcg/min, titrate slowly to effect. Maximum infusion rate without OLMC consult is 50 mcg/min.

In place of or following initial sublingual use, may utilize transdermal application of 1 inch ointment to chest wall.

How Supplied: Metered dose spray 0.4mg/spray.
Tablets for sublingual absorption 0.4 mg.
Intravenous infusion - Mix 50 mg into 250 mL D5W (200 mcg/mL)
10 mcg/min using microdrip infusion set is 3 mL/hour rate
20 mcg/min using microdrip infusion set is 6mL/hour rate
Transdermal ointment in 2% nitroglycerin concentration
1 inch = 15 mg of nitroglycerin
(Always check concentration and dose per container at time of patient medication administration)

16G – ACTIVATED CHARCOAL

PARAMEDIC

Class: Adsorbant

Actions/Pharmacodynamics: Activated charcoal is a liquid suspension that adsorbs many drugs and chemicals. It acts by binding / adsorbing toxic substances, thereby inhibiting their GI absorption, uptake into the liver, and thus, their presence in the bloodstream for action, also called "bioavailability". Activated charcoal has a tremendous surface area, allowing for a large amount of adsorption. The combined complex formed by the adsorption process is excreted from the body in the feces. It is a general purpose emergency treatment of poisoning by most drugs and chemicals, e.g., acetaminophen, aspirin, atropine, barbiturates, digitalis, glycosides, phenytoin, propoxyphene, strychnine, and tricyclic antidepressants, among many others.

Indications: Poisonings - General Management (8A)

Contraindications: Activated charcoal is contraindicated for treatment of poisoning by cyanide, mineral acids, caustic alkalis, organic solvents, iron, ethanol, and methanol. Activated charcoal may not be administered in patients with current or suspected imminent altered mental status, dysphagia, or vomiting to prevent elevated risk of aspiration of charcoal.

Pharmacokinetics: Not absorbed; onset is immediate; peak effect, duration, and half – life: unknown.

Side Effects: GI: vomiting following rapid ingestion of high doses, abdominal cramping, abdominal bloating, constipation (diarrhea from sorbitol additive).

Dosage: **Poisonings - General Management - Adult & Pediatric (8A)**
1 gram/kg PO (**OLMC or OK Poison Center order required**; Consult for order only if remaining scene/transport time estimated to exceed 30 mins)

How Supplied: 25 grams of activated charcoal in aqueous suspension in bottle. (Always check concentration and dose per container at time of patient medication administration)

Special Comment: Activated charcoal, while historically often administered in the setting of ingested poisonings, is no longer utilized with the same frequency. The American Board of Medical Toxicology does not recommend routinely administering activated charcoal to all suspected ingested poisonings. The purpose of a required OLMC or OK Poison Center order requirement is to prevent unnecessary use of activated charcoal and the side effects its use can create - especially vomiting and aspiration.

16H – ADENOSINE (ADENOCARD®)

PARAMEDIC

Class: Anti-Tachydysrhythmic (Purine Nucleoside)

Actions/Pharmacodynamics: Slows electrical conduction through the cardiac atrioventricular (AV) node, with ability to interrupt reentry pathways through the AV and sinoatrial (SA) nodes. Adenosine is administered to convert paroxysmal supraventricular tachycardia (PSVT) to normal sinus rhythm.

Indications: Tachycardia - Stable (5F)
PSVT (sustained regular, narrow-complex tachycardia >150 bpm in adults) & systolic BP ≥ 100mmHg, failed valsalva maneuver.

Contraindications: 2nd/3rd degree AV Blocks (may induce asystole)
Known Wolff-Parkinson-White Syndrome (may increase heart rate)
Known Sick Sinus Syndrome (may induce asystole)
Bradycardia (may induce symptomatic hypotension)

Pharmacokinetics: Onset of action within 10-20 seconds after IV administration. Very rapid metabolism (and duration of effect) within 10-20 seconds after IV administration.

Side Effects: Common, though transient, symptoms include chest pain, palpitations of irregular bradycardia, dyspnea, lightheadedness, numbness, and sweating. A constellation of these side effects may produce significant patient apprehension and/or sense of impending doom. The patient should be advised of these possibilities prior to adenosine administration and given reassurance such symptoms will be short-lived in duration of seconds. Transient asystolic or profound, irregular bradycardic rhythms may be observed on ECG monitoring.

Dosage: **Tachycardia - Stable - Adult (5F)** (PSVT as described above)
6-12 mg rapid IVP (1 – 2 seconds) followed rapidly by 10 mL saline flush.
May repeat at 12 mg.

****OLMC Order Only for use in pediatric patients.**

OLMC may direct use of adenosine in evaluating etiology of regular, monomorphic wide complex tachycardia.

How Supplied: 12 mg/4 mL in prefilled syringe.
(Always check concentration and dose per container at time of patient medication administration)

16I – AMIODARONE (CORDARONE®, NEXTERONE®)

PARAMEDIC

Class: Class III Anti-Dysrhythmic (Vaughn William Classification)

Actions/Pharmacodynamics: Prolongs the cardiac action potential's refractory period, slowing conduction through the heart. Amiodarone also has secondary actions in the other three classifications of anti-dysrhythmics. Amiodarone blocks sodium channels (class I) which can prevent cardiac action potentials. It is a non-competitive anti-sympathetic (class II) which slows cardiac action potentials. Amiodarone also slows conduction through the cardiac atrioventricular (AV) node (class IV). In sum, all of these actions lead to slowing of conduction and prolongation of refractoriness in the cardiac conduction system.

Indications: Ventricular Fibrillation/Pulseless Ventricular Tachycardia (4G)
- Tachycardia - Stable (5F)
  - Wide-Complex Tachycardia of Uncertain Type or Monomorphic VentricularTachycardia (if heart rate ≥ 150 beats per minute with systolic BP ≥ 100 mmHg in adults)
  - Narrow-Complex Tachycardia (if heart rate ≥ 150 beats per minute with systolic BP ≥ 100 mmHg in adults) ****OLMC Order Only**
- Tachycardia - Unstable (5G)
  - Post-Cardioverion of Ventricular Tachycardia
- Premature Ventricular Contractions (5K)
  - Symptomatic Premature Ventricular Contractions (with BP < 100mmHg in adults due to frequent non-conducted ventricular impulses and in absence of 2nd/3rd degree AV blocks)

Contraindications: 2nd/3rd degree AV blocks (may induce asystole)
Bradycardia (may induce symptomatic hypotension)

Pharmacokinetics: Onset of action within 60 seconds after IV administration, with effects lasting up to 20-25 minutes.

Side Effects: Hypotension is the most common side effect, requiring treatment in less than 20% of patients (transient effect). Bradycardia and AV Block may also result, requiring treatment in less than 10% of patients (transient effect). In a very rare circumstance, as with all anti-dysrythmics which can have pro-dysrhythmic effects, torsades may result from excessive prolongation of the cardiac action potential. When indicated by protocol, the benefits of amiodarone administration exceed these risks of side effects.

PROTOCOL 16I: Amiodarone (Cordarone®, Nexterone®), cont.

Dosage:

Ventricular Fibrillation/Pulseless Ventricular Tachycardia - Adult (4G)
(refractory to initial defibrillation attempt)
300 mg IVP/IOP. Repeat at 150 mg IVP/IOP in 5 minutes to maximum cumulative dose of 450 mg. Epinephrine 1 mg (1:10,000) IVP/IOP is to be given with every amiodarone administration.

Ventricular Fibrillation/Pulseless Ventricular Tachycardia - Pediatric (4G)
(refractory to initial defibrillation attempts)
5 mg/kg IVP/IOP in single dose. Epinephrine 0.01 mg/kg (1:10,000, 0.1 mL/kg) IVP/IOP is to be given with every amiodarone administration.

Ventricular Fibrillation/Pulseless Ventricular Tachycardia - Adult (4G)
(post return of sustained spontaneous circulation)
150 mg over 10 minutes (15 mg/minute or 0.3 ml/minute very slow IVP/IOP/IVPB) IF maximum cumulative dose of 450 mg has not been achieved.

Ventricular Fibrillation/Pulseless Ventricular Tachycardia - Pediatric (4G)
(post return of sustained spontaneous circulation)
Tachycardia - Stable - Pediatric (5F)
(wide-complex tachycardia of uncertain type or monomorphic ventricular tachycardia; narrow-complex tachycardia)
Tachycardia - Unstable - Pediatric (5G)
Premature Ventricular Contractions - Pediatric (5K)
****OLMC Consult & Order Only**

Tachycardia - Stable - Adult (5F)
(wide–complex tachycardia of uncertain type - standing order; monomorphic ventricular tachycardia - standing order; narrow complex - **OLMC order only)
Tachycardia - Unstable - Adult (5G)
(post cardioversion of ventricular tachycardia)
Premature Ventricular Contractions - Adult (5K)
150 mg over 10 minutes (15 mg/minute or 0.3 ml/minute very slow IVP/IOP/IVPB).

How Supplied:

150 mg/3 mL in vial, ampule, or pre-filled syringe.
150 mg/100 mL pre-mixed infusion.
(Always check concentration and dose per container at time of patient medication administration)

16J – ATROPINE SULFATE

PARAMEDIC

Class: Parasympatholytic

Actions/Pharmacodynamics: Blocks parasympathetic impulses to the heart via the vagusnerve. Atropine increases the rate of cardiac sinoatrial (SA) node discharges, enhances conduction through the atrioventricular (AV) node, and by increasing heart rate, increases the cardiac output and blood pressure. Additionally, in the treatment of indicated poisonings (organophosphates) atropine reverses muscarinic effects of acetylcholine, including diaphoresis, diarrhea, urination, bronchorrhea (secretions from the lower respiratory tract), emesis, lacrimation (tearing), and salivation. Atropine produces dilation of pupils by blocking stimulation of the ciliary muscle surrounding the pupils.

Indications: Bradycardia (5D)
Poisonings – General Management (Organophosphate) (8A)

Contraindications: None absolute in indicated situations.

Pharmacokinetics: Typical onset within 60 seconds given IV. Effects can persist in excess of 1 hour.

Side Effects: Tachycardia (either supraventricular or ventricular), hypertension, palpitations, blurred vision due to pupillary dilation, photophobia, dry mouth.

Adult organophospate poisoning: 2mg IVP/IOP/IM. Use IVP for more severe presentations. May repeat as often as every 3-5 minutes if symptoms progressive or persistent.

Dosage:

Bradycardia – Symptomatic & Systolic BP < 100 mmHg (Sinus, First Degree, 2nd Degree Type I) - Adult(5D)
In Non-Acute Coronary Syndrome, 0.5 mg IVP/IOP.
May repeat every 5 minutes to cumulative maximum dose of 3 mg

Bradycardia - Symptomatic & Systolic BP < 70 + (2 x age in years) mmHg (Sinus, First Degree, 2nd Degree Type I) - Pediatric (5D)
Unresponsive to Epinephrine, 0.02 mg/kg IVP/IOP; minimum dose 0.1 mg
Max. single dose 0.5 mg
May repeat once.

Poisonings – General Management (Organophosphate) – Adult (8A)
2 mg IVP/IOP/IM. Use IVP for more severe presentation.
Repeat every 3-5 minutes if symptoms progressive.

PROTOCOL 16J: Atropine Sulfate, cont.

Dosage, cont:

Poisonings – General Management (Organophosphate) – Pediatric (8A)
0.05 mg/kg IVP/IOP/IM. Use IVP for more severe presentation.
Minimum dose 0.1 mg.
Consult with OLMCP for repeat dosing needs.

How Supplied: 1 mg/10 mL prefilled syringe
1 mg/1 mL vial
0.25 mg/5 mL prefilled syringe for pediatric use
(Always check concentration and dose per container at time of patient medication administration)

16K – CALCIUM CHLORIDE

PARAMEDIC

Class: Electrolyte

Actions/Pharmacodynamics: Calcium causes a significant increase in myocardial contractility and in ventricular automaticity. It is used as an antidote for some electrolyte imbalances (eg. stabilizing cardiac rhythm in the setting of hyperkalemia) and to minimize the side effects from calcium channel blocker overdose. The actions of calcium chloride are similar to those of calcium gluconate but, since it ionizes more readily, it is more potent than calcium gluconate.

Indications: Specific Causes of Cardiac Arrest (Hyperkalemia) (4I)
Poisonings - General Management (Calcium Channel Blocker Overdose) (8A)
Dialysis-Related Issues (Hyperkalemia) (9E)
Crush Injury Syndrome (Hyperkalemia Prophylaxis) (10K)

Contraindications: Calcium chloride is contraindicated in ventricular fibrillation unless known hyperkalemia, in known hypercalcemia, and in suspected digitalis toxicity. It should be used with caution in patients taking digoxin as it may precipitate toxicity. Safe use in pregnancy and in children has not been established, though in indicated conditions, benefits outweigh risks.

Pharmacokinetics: Onset nearly immediate when given IVP/IOP. The peak effect time frame and duration of effect is not well established.

Side Effects: Paresthesias (tingling), syncope, sensations of heat waves (peripheral vasodilation), pain and burning at IV site, skin necrosis and sloughing (with extravasation), hypotension, bradycardia, cardiac dysrhythmias, cardiac arrest.

Dosage: **Specific Causes of Cardiac Arrest (Hyperkalemia) - Adult & Pediatric (4I)**
Poisonings - General Management (Calcium Channel Blocker Overdose) - Adult & Pediatric (8A)
Dialysis-Related Issues (Hyperkalemia) - Adult & Pediatric (9E)
Crush Injury Syndrome (Hyperkalemia Prophylaxis) - Adult & Pediatric (10K)
10 mg/kg (10% solution) IVP/IOP, maximum dose of 1 gram

How Supplied: 1 gram in a 10 mL prefilled syringe (100 mg/mL)
(Always check concentration and dose per container at time of patient medication administration)

Special Comments: Calcium chloride will interact with sodium bicarbonate and form a precipitate. Do not give both medications via the same vascular access line unless giving a copious flush of NS - approximately 50+ mL - between medications. In general, use an 18-20 gauge angiocatheter in a proximal IV site or use an IO line and test line patency before administration. In non-cardiac arrest or non-impending cardiac arrest settings, administer at 0.5 -1.0 mL per minute to reduce chances of venous irritation and extravasation.

16L – HYDRALAZINE (APRESOLINE®)

PARAMEDIC

Class: Anti-Hypertensive

Actions/Pharmacodynamics: Reduces blood pressure via relaxation of arterial smooth muscle, resulting in vasodilation, decreasing peripheral resistance. Alters vascular smooth muscle cellular metabolism of calcium, leading to reduction of vascular muscle contraction.

Indications: Hypertensive Emergency (5L)
Complications of Pregnancy (Hypertensive Emergency) (13D)

Contraindications: Known hypersensitivity to hydralazine.
Cardiogenic shock
Mitral valvular rheumatic heart disease
Acute coronary syndrome

Safe use during pregnancy and children is not firmly established in pharmaceutical studies, though hydralazine has been used effectively in pregnancy and in pediatrics.

Pharmacokinetics: Onset is within 10 minutes IV; peak effectsbetween 10-80 minutes.

Side Effects: Dizziness, headache, transient paresthesias (eg. scalp tingling), numbness, postural hypotension, angina, palpitations, tachycardia, syncope, pulmonary edema, dysrhythmias (tachycardias) following IV administration, dyspnea, nausea, vomiting.

Dosage: **Hypertensive Emergency - Adult (5L)**
Complications of Pregnancy (Hypertensive Emergency) - Adult (13D)
10 mg Slow IVP.May repeat 10mg every 30 minutes as needed up to cumulative maximum dose of 30 mg.

Hypertensive Emergency - Pediatric (5L)
****OLMC Order Only.**Rarely required.
Typical pediatric dose is 0.5mg/kg up to 0.9mg/kg, with a max single dose 10mg.

How Supplied: 20 mg/1 mL in a 1 mL vial
(Always check concentration and dose per container at time of patient medication administration)

16M – HYDROXOCOBALAMIN (CYANOKIT®)

PARAMEDIC

Class: Cyanide Antidote

Actions/Pharmacodynamics: Hydroxocobalamin binds cyanide, forming cyanocobalamin for urinary excretion.

Indications: Cyanide (12E)

Contraindications: None in the setting of suspected cyanide toxicity.

Pharmacokinetics: Near immediate onset of action following IVPB initiation. Effect is seen for hours, with duration of action seen predominantly in the first 24 hours following administration, but measurable for days.

Side Effects: Redness of skin and mucous membranes may be prominently noted. Additional side effects include headache, dizziness, restlessness, eye irritation, throat irritation, dyspnea, pulmonary edema, chest tightness, hypertension, tachycardia, palpitations, nausea, vomiting, diarrhea, abdominal pain, dysphagia, red urine, and hives.

Dosage:

Cyanide - Adult (12E)
5 grams IVPB in 15 minutes

Cyanide - Pediatric (12E)
Safe use in children has not been firmly established, though in indicated clinical situation, benefit out weights risk. Contact OLMC for consult and order. The pediatric dose used in most situations is 70 mg/kg IVPB in 15 minutes.

How Supplied: CYANOKIT® preparations include either one glass vial containing 5 grams of hydroxocobalamin as a dark red crystalline powder for reconstitution with 200 mL normal saline or a set of two glass vials, each containing 2.5 grams of hydroxocobalamin as a dark red crystalline powder for reconstitution with 100 mL normal saline per vial.
Follow full instructions accompanying CYANOKIT® for preparation and administration, including use of transfer spike for normal saline addition to the vial(s), rocking, but not shaking the vial for 60 seconds prior to administration, and administering the infusion from the vial(s).
(Always check concentration and dose per container at time of patient medication administration)

Special Comment: Multiple drug-drug incompatibilities exist with hydroxocobalamin. Use a separate IV line for the administration of hydroxocobalamin.

16N DEXTROSE (50% as D50 and 25% as D25)

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

Class: Carbohydrate

Actions/Pharmacodynamics: Dextrose is the principal form of glucose (sugar) used by the body to create energy and support critical metabolic processes. Since serious brain injury can occur in prolonged hypoglycemia, the timely administration of glucose is essential in treating hypoglycemia (blood glucose < 50 mg/dL). Dextrose 50% IV is the treatment of choice for hypoglycemic patients of adult age or of pediatric age with weight at or exceeding 25 kg. Dextrose 25% IV is the treatment of choice for hypoglycemic patients of pediatric age with weight less than 25 kg.

Indications: Respiratory Arrest (3A)
Specific Cause of Cardiac Arrest (4I)
Altered Mental Status (6B)
Seizure (6D)
Syncope (6E)
Dystonic Reaction (6F)
Behavioral Disorder (7A)
Poisonings - General Management (8A)
Dialysis -Related Issues (9E)
Complications of Pregnancy (13D)
For all listed situations, indication is hypoglycemia (blood glucose < 50 mg/dL).

Contraindications: Hyperglycemia (blood glucose > 100 mg/dL)
Normoglycemia in the setting of suspected cerebral ischemia.

Pharmacokinetics: Onset with 60 seconds after IVP with peak effect and duration of action dependent upon degree and cause of hypoglycemia. Usually effective duration in excess of 30 minutes.

Side Effects: Warmth, pain, or burning at the injection site. D50 extravasation can cause tissue necrosis (requiring skin graft surgery), phlebitis, sclerosis, or thrombosis at the injection site.

PROTOCOL 16N: Dextrose (50% as D50 and 25% as D25)

Dosage:

Respiratory Arrest - Adult & Pediatric weight ≥ 25 kg (3A)
Specific Cause of Cardiac Arrest - Adult & Pediatric weight ≥ 25 kg (4I)
Altered Mental Status - Adult & Pediatric weight ≥ 25 kg (6B)
Seizure - Adult & Pediatric weight ≥ 25 kg (6D)
Syncope - Adult & Pediatric weight ≥ 25 kg (6E)
Dystonic Reaction - Adult & Pediatric weight ≥ 25 kg (6F)
Behavioral Disorder - Adult & Pediatric weight ≥ 25 kg (7A)
Poisonings - General Management - Adult & Pediatric weight ≥ 25 kg (8A)
Dialysis -Related Issues - Adult & Pediatric weight ≥ 25 kg (9E)
Complications of Pregnancy - Adult & Pediatric weight ≥ 25 kg (13D)
For hypoglycemia (blood glucose < 50 mg/dL):
Dextrose 50% (D50) 1 mL/kg IVP up to 50 mL

Respiratory Arrest - Pediatric weight < 25 kg (3A)
Specific Cause of Cardiac Arrest - Pediatric weight < 25 kg (4I)
Altered Mental Status - Pediatric weight < 25 kg (6B)
Seizure - Pediatric weight < 25 kg (6D)
Syncope - Pediatric weight < 25 kg (6E)
Dystonic Reaction - Pediatric weight < 25 kg (6F)
Behavioral Disorder - Pediatric weight < 25 kg (7A)
Poisonings - General Management - Pediatric weight < 25 kg (8A)
Dialysis -Related Issues - Pediatric weight < 25 kg (9E)
For hypoglycemia (blood glucose < 50 mg/dL)
Dextrose 25% (D25) 2 mL/kg IVP up to 50 mL

How Supplied: Prefilled syringes of D50 - 25 grams dextrose in 50 mL of water (0.5 gram/mL)
Prefilled syringes of D25 - 2.5 grams dextrose in 10 mL of water (0.25 gram/mL)

Special Comments: D50 should be administered using an infusing IV, **NOT** a saline lock. The tissue caustic nature of D50 can be decreased by performing a slow and non-forceful IV push through the side port of an IV line that is flowing with normal saline into the patient's vein. Because of the risk of extravasation and the consequences of local tissue damage from extravasation, neither D50 nor D25 should be administered through an external jugular IV. High concentrations of dextrose can lead to cerebral edema in younger/smaller pediatric patients, requiring 1:1 dilution of D50 with normal saline to make D25 or using prefilled D25. A repeat determination of blood glucose level is to be performed post D50 or D25 administration.

16O – DIAZEPAM (VALIUM®)

PARAMEDIC

Class: Sedative; Anticonvulsant; Muscle Relaxant; Anxiolytic (Benzodiazepine)

Actions/Pharmacodynamics: Intermediate - acting benzodiazepine with central nervous system depressant, anticonvulsant, muscle relaxant, and anxiolytic effects. Like the other benzodiazepines, it has no effect on pain. Diazepam has considerably more muscle relaxant properties than midazolam, though no substantial amnestic effects as with midazolam.

Indications: Medication Assisted Intubation (2H)
Post-intubation sedation - onset delay does not favor pre-intubation use
Seizure (6D)
(Midazolam preferred benzodiazepine due to faster onset of action)
Dystonic Reactions (6F)
Chemical Restraint (7C)
(Midazolam preferred benzodiazepine due to faster onset of action)
Poisonings - General Management (8A)
Suspected stimulant toxicity = severe agitation, HTN, tachycardia, diaphoresis
Head/Neck/Spine Injury (10A)
Heat Illness (11A)

Contraindications: Patients with intolerance to benzodiazepines, acute narrow - angle glaucoma, shock, or coma. Caution with use in patients with COPD, chronic hepatic or renal failure, CHF, acute alcohol intoxication, and the elderly due to increased risk of respiratory depression.

Pharmacokinetics: Onset is 3-5 minutes, IVP/IOP; 15-30 minutes IM with erratic absorption, mandating IM dosing only utilized as a last option in adults; peak effects in 15-45 minutes. Duration is 2+ hours IVP/IOP/IM; half – life can reach 20 – 50 hours.

Side Effects: Headache, euphoria, drowsiness, excessive sedation, confusion, dizziness, blurred vision, diplopia, nystagmus, respiratory arrest, hypotension, nausea, vomiting.

Dosage: **Medication Assisted Intubation (Post Intubation Sedation) - Adult (2H)**
0.1 mg/kg to max 5 mg IVP/IOP, may repeat once if systolic BP > 100 mmHg

Seizure - Adult (6D)
Head/Neck/Spine Injury - Adult (10A)
Heat Illness - Adult (11A)
5 mg IVP/IOP or 10 mg IM for active seizure
May repeat once in 5 minutes if still seizing.

PROTOCOL 16O: Diazepam (Valium®), cont.

Dosage, cont.:

Seizure - Pediatric (6D)
Head/Neck/Spine Injury - Pediatric (10A)
Heat Illness - Pediatric (11A)
0.1 mg/kg to max 5 mg IVP/IOP/IM for active seizure
May repeat once in 5 minutes if still seizing.

Dystonic Reactions - Adult (6F)
5mg IVP

Dystonic Reactions - Pediatric (6F)
0.1 mg/kg to max 5 mg IVP/IM

Chemical Restraint - Adult (7C)
5 mg IVP/IOP or 10 mg IM

Chemical Restraint - Pediatric (7C)
0.1 mg/kg to max 5 mg IVP/IOP/IM

Poisoning - General Management (Suspected Stimulant Toxic) - Adult (8A)
2.5 mg - 5 mg IVP

Poisoning - General Management (Suspected Stimulant Toxic) - Pediatric (8A)
****OLMC Order Only**

How Supplied: 10 mg/2 mL in vials, ampules, or pre-filled syringes.
(Always check concentration and dose per container at time of patient medication administration)

16P – DILTIAZEM (CARDIZEM®)

PARAMEDIC

Class: Calcium Channel Blocker

Actions/Pharmacodynamics: Diltiazem is a slow calcium channel blocker with pharmacologic actions similar to those of verapamil. It inhabits calcium ion influx through slow channels into cells of myocardial and arterial smooth muscle (both coronary and peripheral blood vessels). As a result, intracellular calcium remains at sub-threshold levels insufficient to stimulate cell excitation and contraction. Diltiazem slows SA and AV node conduction (antidyshythmic effect) without affecting normal atrial action potential or intraventricular conduction.

Indications: Tachycardia - Stable (5F)
Sustained narrow-complex tachycardia > 150 bpm in adults with systolic BP ≥ 100mmHg
****OLMC Order Only**

Contraindications: Known hypersensitivity to diltiazem
2nd/3rd degree AV Blocks (may induce asystole)
Known Wolff-Parkinson-White Syndrome (may increase heart rate)
Known Sick Sinus Syndrome (may induce asystole)
Hypotension
Bradycardia

Safe use in pregnancy and in children has not been established. Use with caution in CHF (especially if patient is also receiving a beta-blocker), conduction abnormalities, renal or hepatic impairment and the elderly due to exaggerated degree of effect.

Pharmacokinetics: Onset is 3 minutes; peak effect in 7 minutes; duration is 1-3 hours; half-life is 2 hours.

Side Effects: Headache, fatigue, dizziness, dysrhythmias, 2nd/3rd degree AV block, bradycardia, CHF, hypotension, syncope, palpitations.

Dosage: **Tachycardia - Stable - Adult (5F)**
Sustained narrow-complex tachycardia > 150 bpm in adults with systolic BP ≥ 100mmHg
****OLMC Order Only**
Usual adult dose is 0.25 mg/kg slow IVP over 2 minutes

How Supplied: 25 mg in 5 mL vial (5 mg/mL)
(Always check concentration and dose per container at time of patient medication administration)

16Q – DIPHENHYDRAMINE (BENADRYL®)

PARAMEDIC

Class: Antihistamine, Anticholinergic

Actions/Pharmacodynamics: Diphenhydramine competes for H1 – histamine receptor sites on effector cells, thus blocking histamine release. Histamine release creates some of the common signs and symptoms of an allergic response: pruritis (itching), mucus secretion, and capillary leaking, which contributes to the formation of urticaria (hives), erythematous skin, and mucosal edema. In the setting of a dystonic reaction, the balance of dopamine and choline must be changed within the brain. The most clinically feasible method of reversing a dystonic reaction, though inhibiting the enzyme acetylcholinesterase, is through the anti-cholinergic effect of a medication like diphenhydramine.

Indications: Dystonic Reactions (6F)
Acute Allergic Reactions (8D)
Bee/Wasp Stings (8F)

Contraindications: Known hypersensitivity to diphenhydramine. While rare, allergic reaction to diphenhydramine is possible and should be considered valid if stated or documented in a patient's medical history.

Pharmacokinetics: Onset within 15 – 30 minutes; duration is approximately 6 hours.

Side Effects: Drowsiness, dizziness, disturbed coordination.

Dosage:

Dystonic Reactions - Adult (6F)
Acute Allergic Reactions- Adult (8D)
Bee/Wasp Stings - Adult (8F)
50 mg IM/IVP

Dystonic Reactions - Pediatric (6F)
Acute Allergic Reactions- Pediatric (8D)
Bee/Wasp Stings - Pediatric (8F)
1 mg/kg IM/IVP to maximum of 50 mg

How Supplied: 50 mg/ 1 mL in vial, ampule, or pre-filled syringe.
(Always check concentration and dose per container at time of patient medication administration)

16R – DOPAMINE (INTROPIN®)

PARAMEDIC

Class: Vasoconstrictor

Actions/Pharmacodynamics: Dose dependent. Higher doses (5+ mcg/kg/min) increasingly stimulate alpha receptors in the peripheral vasculature, producing vasoconstriction-related increases in system blood pressure. Concurrent beta receptor stimulation may produce increases in heart rate and mild bronchodilation. Lower doses (<5 mcg/kg/min), as may be encountered infrequently in interhospital transfers, produce mesenteric (intestinal) and renal vascular dilation to ensure continued perfusion to these organ systems in complicated medical illness that would otherwise sacrifice such circulation.

Indications:
Dyspnea - Congestive Heart Failure (Cardiogenic Shock) (3E)
Post Cardiac Arrest Treatment (Cardiogenic Shock) (4J)
Acute Coronary Syndrome (Cardiogenic Shock) (5C)
Fever (Septic Shock) (9B)
Dialysis-Related Issues (9E)
For all listed situations, indication is hypotension (adult = systolic < 100 mmHg) due to cardiogenic, septic, or neurogenic shock either refractory to intravascular fluid boluses or in which intravascular fluid bolusing is contraindicated (eg. pulmonary edema).

Contraindications: Hypertension

Pharmacokinetics: Onset of action within 5 minutes after IV/IO infusion initiated. Rapid metabolism, requiring ongoing IV/IO infusion to maintain clinical effects.

Side Effects: Palpitations, tachycardia, chest pain, and hypertension if not titrated.

Dosage:

Dyspnea - Congestive Heart Failure (Cardiogenic Shock) - Adult (3E)
Post Cardiac Arrest Treatment (Cardiogenic Shock) - Adult (4J)
Acute Coronary Syndrome (Cardiogenic Shock) - Adult (5C)
Fever (Septic Shock) - Adult (9B)
Dialysis-Related Issues - Adult (9E)
For hypotension (shock) refractory to fluids or fluids contraindicated
5 – 20 mcg/kg/minute - see dosage chart - titrate to a sys B/P ≥ 100 mmHg.

Dyspnea - Congestive Heart Failure (Cardiogenic Shock) - Pediatric (3E)
Post Cardiac Arrest Treatment (Cardiogenic Shock) - Pediatric (4J)
Fever (Septic Shock) - Pediatric (9B)
Dialysis-Related Issues - Pediatric (9E)
For hypotension (shock) refractory to fluids or fluids contraindicated
****OLMC Order Only.**

PROTOCOL 16R: Dopamine (Intropin®), cont

Dopamine Infusion Adult Dosage Chart

Dopamine	Dose in mcg				
Patient Weight in Kilograms	5	10	15	20	mL/hr or drips/minute (for 1600 mcg concentration only)
40	8	15	23	30	
50	9	19	28	38	
60	11	23	34	45	
70	13	26	39	53	
80	15	30	45	60	
90	17	34	51	68	
100	19	38	56	75	
110	21	41	62	83	
120	23	45	68	90	
130	24	49	73	98	
140	26	53	79	105	
150	28	56	84	113	
160	30	60	90	120	
170	32	64	96	128	
180	34	68	101	135	
190	36	71	107	143	
200	38	75	113	150	
210	39	79	118	158	
220	41	83	124	165	
230	43	86	129	173	
240	45	90	135	180	
250	47	94	141	188	

How Supplied: 400 mg/10 mL vial to be mixed into 250 mL D5W. (1600 mcg/mL concentration) OR pre-mixed dopamine infusion at 1600 mcg/mL concentration. (Always check concentration and dose per container at time of patient medication administration)

Special Comments: Relative caution should be exercised prior to use in the setting of marked tachydysrhythmias, due to the potential for further increase in heart rates. In the setting of tachydysrhythmia-induced cardiogenic shock, treat per Protocol 5G - Tachycardia - Unstable. Ensure aggressive fluid resuscitation is accomplished (unless contraindicated) prior to dopamine use.

16S – EPINEPHRINE 1:1000 & 1:10,000

PARAMEDIC

Class: Vasoconstrictor, Bronchodilator (Catecholamine)

Actions/Pharmacodynamics: Stimulates alpha receptors in the peripheral vasculature, producing vasoconstriction-related increases in systemic blood pressure. Stimulates beta-1 receptors in the myocardium, producing increases in heart rate, myocardial contraction, and as a result, cardiac output. Stimulates beta-2 receptors in the lower respiratory tract smooth musculature, producing bronchodilation.

Indications:
Dyspnea - Asthma (Severe & Refractory to Nebulization) (3C)
Asystole (4F)
Ventricular Fibrillation/Pulseless Ventricular Tachycardia (4G)
Pulseless Electrical Activity (4H)
Bradycardia (Pediatric) (5D)
Acute Allergic Reactions (Anaphylaxis) (8D)
Snakebites (Anaphylaxis) (8E)
Bee/Wasp Stings (Anaphylaxis) (8F)

Contraindications: None absolute in indications above.

Safety in pregnancy not firmly established, though when clinically indicated the benefits outweigh risks.

Pharmacokinetics: Onset of action within 2 minutes after IVP/IOP; within 5-10 minutes after IM. Duration of effect ranges from 3-5 minutes after IVP/IOP to upwards of 30 minutes after IM.

Side Effects: Restlessness, anxiety, generalized tremors, headache, dizziness, chest pain, palpitations, hypertension, premature ventricular contractions, tachycardia.

Dosage:

Dyspnea - Asthma (Severe & Refractory to Nebulization) - Adult (3C)
1:1000 0.3 mg IM

****OLMC Order Required if pt ≥ 50 years old, heart illness history, or blood pressure > 140/90 mmHg.**

Dyspnea - Asthma (Severe & Refractory to Nebulization) - Pediatric (3C)
1:1000 0.01 mg/kg (0.01 mL/kg) not to exceed 0.3 mg (0.3 mL) IM

****OLMC Order required if heart illness history or blood pressure > 140/90 mmHg.**

PROTOCOL 16S: Epinephrine 1:1000 & 1:10,000, cont

Dosage, cont:

Asystole - Adult (4F)
Ventricular Fibrillation/Pulseless Ventricular Tachycardia - Adult (4G)
Pulseless Electrical Activity - Adult (4H)
1:10,000 1 mg IVP/IOP
Repeat every 3 - 5 minutes while resuscitating cardiac arrest

Asystole - Pediatric (4F)
Ventricular Fibrillation/Pulseless Ventricular Tachycardia - Pediatric (4G)
Pulseless Electrical Activity - Pediatric (4H)
1:10,000 0.01 mg/kg (0.1 mL/kg) IVP/IOP
Repeat every 3 - 5 minutes while resuscitating cardiac arrest

Bradycardia - Symptomatic & Systolic BP < 70 + (2 x age in years) mmHg (Sinus, First Degree, 2nd Degree Type I) - Pediatric (5D)
1:10,000 0.01 mg/kg (0.1 mL/kg) IVP/IOP
May repeat once.

Acute Allergic Reactions (Anaphylaxis) - Adult (8D)
Snakebites (Anaphylaxis) - Adult (8E)
Bee/Wasp Stings (Anaphylaxis) - Adult (8F)
1:1000 0.3 mg IM
If anaphylaxis refractory to above IM dose:
1:10,000 1 mg slow IVP/IOP over 3 minutes

Acute Allergic Reactions (Anaphylaxis) - Pediatric (8D)
Snakebites (Anaphylaxis) - Pediatric (8E)
Bee/Wasp Stings (Anaphylaxis) - Pediatric (8F)
1:1000 0.01 mg/kg (0.01 mL/kg) not to exceed 0.3 mg (0.3 mL) IM
If anaphylaxis refractory to above IM dose:
1:10,000 0.01 mg/kg slow IVP/IOP over 3 minutes

How Supplied: **Epinephrine *1:1000*** in 1 mg/1mL ampules or 30 mg/30mL vial
(Always check concentration and dose per container at time of patient medication administration)

Epinephrine 1:10,000 in 1 mg/10mL prefilled syringes
(Always check concentration and dose per container at time of patient medication administration)

Special Comments: Be sure to administer correct concentration. Pulsatile patients ages 35 years or greater, particularly those with known coronary artery disease, receiving epinephrine should have ECG monitoring initiated and continued as soon as an ECG monitor is available.

16T – ETOMIDATE (AMIDATE®)

PARAMEDIC

Class: Sedative - Hypnotic (non-narcotic/opiate; non-benzodiazepine; non-barbiturate)

Actions/Pharmacodynamics: Etomidate is an intravenous hypnotic drug without analgesia. Etomidate is safe to use in patients with cardiac illness and patients with traumatic injuries. Etomidate has little to no effect upon myocardial metabolism, cardiac output, or peripheral circulation. Etomidate has been shown to reduce cerebral blood flow, cerebral oxygen consumption, and intracranial pressure – helpful in head injury situations.

Indications: Medication Assisted Intubation (2H)

Contraindications: Known hypersensitivity to etomidate.

Pharmacokinetics: Rapid onset of action, seen as desired sedation within as little as 10-15 seconds, but nearly always within less than 1 minute. Duration of action, based upon a standard dose of 0.3 mg/kg (70 kg adult dose of 20 mg) is 5-15 minutes.

Side Effects: 1) Transient skeletal muscle movements, called myoclonus, have been reported in 10-80% of patients. Most of these movements are mild to moderate in severity. Rarely, these movements are severe in motion and force, though transient. Most movements are bilateral and can involve any part of the body. Results of electroencephalographic studies taken during periods when these muscle movements were observed have failed to reveal true seizure activity. 2) Transient venous pain at injection site, due to propylene glycol, a solvent in Etomidate preparations. 3) Nausea and/or vomiting. 4) Very rarely, hypoventilation and apnea, though Etomidate generally preserves the baseline respiratory activity. 5) Very rarely, hypotension and when seen, usually is due to too rapid IVP administration.

Dosage: **Medication Assisted Intubation - Adult (2H)**
0.3 mg/kg IVP/IOP over 15-30 seconds, given just prior to intubation.

How Supplied: 40 mg/20mL (2 mg/mL) vial or pre-filled syringe
(Always check concentration and dose per container at time of patient medication administration)

Special Comment: Repeated doses of etomidate should be avoided to minimize its effect upon adrenal function. Repeated doses and continuous infusions of etomidate have been linked to adrenal suppression.

16U – FENTANYL (SUBLIMAZE®)

PARAMEDIC

Class: Narcotic analgesic

Actions/Pharmacodynamics: Stimulates central nervous system opiate receptors, producing systemic analgesia. On a milligram weight basis, fentanyl is 50-100 times more potent than morphine. Its duration of action is shorter than morphine or hydromorphone. An IV dose of 100 mcg of fentanyl is roughly equivalent to an IV dose of 10 mg of morphine. Fentanyl has less emetic effects than other narcotic analgesics.

Indications:
Chest Pain – Uncertain Etiology (5A)
Acute Coronary Syndrome (5C)
Snakebites (8E)
Abdominal Pain/Nausea/Vomiting/Diarrhea (9A)
Pain Management (Acute Onset &Chronic Type) (9D)
Eye Injury (10B)
Dental Injury/Pain (10C)
Chest/Abdomen/Pelvis Injury (10D)
Extremity/Amputation Injury (10G)
Compartment Syndrome (10J)
Crush Injury Syndrome (10K)
Burns (10L)
Lightning/Electrical Injury (11C)
Pelvic Pain (13E)
For all listed situations, indication is acute pain control in alert, hemodynamically stable patient.

Contraindications:
Hypotension
Respiratory Depression
Minor Degrees of Pain
Pain Assessed as Factitious

Side Effects: Hypotension, respiratory depression, euphoria, dizziness. Nausea and/or vomiting are rarely seen if administration is slow IVP.

Pharmacokinetics: Onset of action nearly immediate after IV administration. Peak effects occur within 3 – 5 minutes. Duration of effect is 30 - 60 minutes, with a half-life of 6 – 8 hours.

PROTOCOL 16U: Fentanyl (Sublimaze®), cont.

Dosage:

Chest Pain – Uncertain Etiology – Adult (5A)
Acute Coronary Syndrome – Adult (5C)
0.5 mcg/kg slow IVP/IM/IN, maximum single dose of 50 mcg
May repeat every 10 minutes to a maximum cumulative dose of 1.5 mcg/kg or 125 mcg, whichever is lesser

Snakebites – Adult (8E)
Abdominal Pain/Nausea/Vomiting/Diarrhea – Adult (9A)
Pain Management (Acute Onset &Chronic Type) – Adult (9D)
Eye Injury – Adult (10B)
Dental Injury/Pain – Adult (10C)
Chest/Abdomen/Pelvis Injury – Adult (10D)
Extremity/Amputation Injury – Adult (10G)
Compartment Syndrome – Adult (10J)
Crush Injury Syndrome – Adult (10K)
Burns – Adult (10L)
Lightning/Electrical Injury – Adult (11C)
Pelvic Pain – Adult (13E)
For all listed situations, indication is acute pain control in alert, hemodynamically stable patient.
1 mcg/kg slow IVP/IM/IN, maximum single dose of 100 mcg
May repeat every 10 minutes to a maximum cumulative dose of 3 mcg/kg or 250 mcg, whichever is lesser

Chest Pain – Uncertain Etiology – Pediatric (5A)
Snakebites – Pediatric (8E)
Abdominal Pain/Nausea/Vomiting/Diarrhea – Pediatric (9A)
Pain Management (Acute Onset &Chronic Type) – Pediatric (9D)
Eye Injury – Pediatric (10B)
Dental Injury/Pain – Pediatric (10C)
Chest/Abdomen/Pelvis Injury – Pediatric (10D)
Extremity/Amputation Injury – Pediatric (10G)
Compartment Syndrome – Pediatric (10J)
Crush Injury Syndrome – Pediatric (10K)
Burns – Pediatric (10L)
Lightning/Electrical Injury – Pediatric (11C)
Pelvic Pain – Pediatric (13E)
For all listed situations, indication is acute pain control in alert, hemodynamically stable patient
****OLMC Order Only** – Typical dose is 1 mcg/kg up to 50 mcg per dose.

How Supplied:

100 mcg/2 mL (50 mcg/mL) ampule, vial, or pre-filled syringe
250 mcg/5 mL (50 mcg/mL) ampule or vial
500 mcg/10 mL (50 mcg/mL) vial
(Always check concentration and dose per container at time of patient medication administration)

16V – GLUCAGON

EMT-INTERMEDIATE 85	Intramuscular use only – 3A 4I 6B 6D 6E 6F 7A 8A 13D
ADVANCED EMT	Intramuscular use only – 3A 4I 6B 6D 6E 6F 7A 8A 13D
PARAMEDIC	

Class: Hormone

Actions/Pharmacodynamics: Glucagon is a hormone produced in the pancreas. When released in times of hypoglycemia, it causes a breakdown of glycogen (stored in the liver) to glucose and inhibits the subsequent synthesis of glycogen from circulating glucose. Both actions increase the blood levels of glucose. Given via the IM route, it is a useful drug in hypoglycemia when IV access is unsuccessful. Glucagon also increases heart rate, myocardial contractility and improves AV conduction in a manner similar to that produced by catecholamines. Its actions are independent of beta blockade and therefore may be useful via IV/IO administration by paramedics for reversing cardiovascular collapse effects of suspected beta blocker toxicity.

Indications: Respiratory Arrest (3A)
Specific Causes of Cardiac Arrest (4I)
Altered Mental Status (6B)
Seizure (6D)
Syncope (6E)
Dystonic Reactions (6F)
Behavioral Disorder (7A)
Poisonings – General Management (8A)
Complications of Pregnancy (13D)

For all listed situations, indication is hypoglycemia (blood glucose <50 mg/dL)without ability to safely administer oral glucose (due to aspiration concern) and without ability to establish IV access in EMT-I85, AEMT, and Paramedic Scopes of Practice.

Additional indication for beta blocker toxicity with hypotension and bradycardia in Paramedic Scope of Practice.

Contraindications: None

Pharmacokinetics: Onset 5 – 20 minutes; peak effects in 30 minutes; duration is 1 – 1.5 hours.

Side Effects: Dizziness, headache, nausea/vomiting, hyperglycemia.

PROTOCOL 16V: Glucagon, cont.

Dosage:

Respiratory Arrest – Adult & Pediatric weight ≥ 25 kg (3A)
Specific Causes of Cardiac Arrest - Adult& Pediatric weight ≥ 25 kg (4I)
Altered Mental Status – Adult & Pediatric weight ≥ 25 kg (6B)
Seizure – Adult & Pediatric weight ≥ 25 kg (6D)
Syncope – Adult & Pediatric weight ≥ 25 kg (6E)
Dystonic Reactions – Adult & Pediatric weight ≥ 25 kg (6F)
Behavioral Disorder – Adult & Pediatric weight ≥ 25 kg (7A)
Poisonings – General Management – Adult & Pediatric weight ≥ 25 kg (8A)
Complications of Pregnancy – Adult & Pediatric weight ≥ 25 kg(13D)
All indicatehypoglycemia without safe PO access and without IV access
1mg IM

Respiratory Arrest - Pediatricweight < 25 kg (3A)
Specific Causes of Cardiac Arrest– Pediatricweight < 25 kg (4I)
Altered Mental Status – Pediatricweight < 25 kg (6B)
Seizure – Pediatricweight < 25 kg (6D)
Syncope – Pediatricweight < 25 kg (6E)
Dystonic Reactions – Pediatric weight < 25 kg (6F)
Behavioral Disorder – Pediatricweight < 25 kg (7A)
Poisonings – General Management – Pediatricweight < 25 kg (8A)
Complications of Pregnancy – Pediatricweight < 25 kg (13D)
All indicate hypoglycemia without safe PO access and without IV access
0.5 mg IM

Specific Causes of Cardiac Arrest - Adult (4I)
Poisonings – General Management - Adult(8A)
Suspected beta blocker toxicity with arrest or hypotension/bradycardia (Paramedic only)
1mg IVP/IOP; May be given IM if no IV access obtainable

Specific Causes of Cardiac Arrest - Pediatric (4I)
Poisonings – General Management –Pediatric (8A)
Suspected beta blocker toxicity with arrest or hypotension/bradycardia (Paramedic only)
0.5mg IVP/IOP; May be given IM if no IV access obtainable

How Supplied: 1 mg dry powder in vial with 1 mL of diluting solute for reconstitution (Always check concentration and dose per container at time of patient medication administration)

16W – HALOPERIDOL (HALDOL®)

PARAMEDIC

Class: Antipsychotic

Therapeutic Action/Pharmacodynamics: Haloperidol is a potent, long – acting antipsychotic agent. While its exact mechanism is unclear, it appears to block the dopamine receptors in the brain associated with mood and behavior. It exerts strong antiemetic effects and impairs central thermoregulation. It also produces weak central anticholinergic effects and transient orthostatic hypotension

Indications: Chemical Restraint (7C)

Contraindications: Known hypersensitivity
Behavioral disorder etiology easily reversed (eg. hypoglycemia)
Minor degrees of agitation
Parkinson's disease
Known seizure disorders (lowers seizure threshold)

CNS depressants, opiates, and alcohol may increase the CNS depression effect of haloperidol. Use with caution in elderly or debilitated patients due to exaggerated effect. Safe use in pregnancy has not been established, though in the indicated setting, benefit outweighs risks.

Pharmacokinetics: Onset is within 10-20 minutes IM; peak effect in 30-45 minutes; duration is 3+ hours, reported up to 35 hours.

Side Effects: CNS depression, seizure, dystonic reactions, dry mouth, blurry vision, bronchospasm, tachycardia, hypertension, hypotension, dysrhythmias, hyperpyrexia, diaphoresis, urinary retention.

Dosage: **Chemical Restraint - Adult (7C)**
5 mg IM (use deep IM injection in large muscle - lateral thigh if possible)

Chemical Restraint - Pediatric (7C)
**** OLMC Order Only**

How Supplied: 5 mg/1mL vial.
(Always check concentration and dose per container at time of patient medication administration)

Special Comments: In emergency situations where the patient's behavior poses an immediate risk to rescuers and bystanders, the IM injection may be given through the patient's clothing to minimize risk of needlestick injuries to rescuers. Dystonic reactions are common with haloperidol; diphenhydramine should be readily available - see Protocol 6F - Dystonic Reactions.

16X – IPRATROPIUM BROMIDE (ATROVENT®)

EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Class: Parasympatholytic Bronchodilator

Actions/Pharmacodynamics: Atrovent is an anticholinergic agent, chemically related to atropine. Given in a nebulized form, it acts directly on the smooth muscle of the bronchial tree by inhibiting acetylcholine at receptor sites. By blocking parasympathetic action, it dilates the bronchial smooth muscle and decreases secretions. It also abolishes the vagally mediated reflex bronchospasm caused by inhaled irritants such as smoke, dust, and cold air and by a range of inflammatory mediators such as histamine.

Indications:
Dyspnea - Asthma (3C)
Dyspnea - Chronic Obstructive Pulmonary Disease (3D)
Acute Allergic Reactions (8D)
Bee/Wasp Stings (8F)

Contraindications and Precautions: Atrovent is contraindicated in patients with hypersensitivity to atropine. It should not be used as the sole pharmacologic treatment for acute bronchospasm. By protocol, atrovent is always administered in conjunction with albuterol.

Pharmacokinetics: Absorption: 10% of inhaled dose reaches lower airway; approximately 0.5% of dose is systemically absorbed; onset within 5-15 minutes; peak effect in 1.5 – 2 hours; duration of effect is up to 4 – 6 hours; half – life is 1.5 – 2 hours.

Side Effects: Cough, reflex bronchospasm, hoarseness, nasal/oral dryness, bitter taste.

Dosage:

Dyspnea - Asthma - Adult & Pediatric weight ≥ 15 kg (3C)
Acute Allergic Reactions - Adult & Pediatric weight ≥ 15 kg (8D)
Bee/Wasp Stings - Adult & Pediatric weight ≥ 15 kg (8F)
0.5 mg nebulized (with albuterol 5 mg)

Dyspnea - Chronic Obstructive Pulmonary Disease - Adult (3D)
0.5 mg nebulized (with albuterol 5 mg), may repeat twice

PROTOCOL 16X: Ipratropium bromide (Atrovent®)

Dosage, cont.:

Dyspnea - Asthma - Pediatric weight < 15 kg (3C)
Acute Allergic Reactions - Pediatric weight < 15 kg (8D)
Bee/Wasp Stings - Pediatric weight < 15 kg (8F)
0.25 mg nebulized (with albuterol 2.5 mg)

How Supplied: 0.5 mg/2.5mL nebulizer solution vials.
(Always check concentration and dose per container at time of patient medication administration)

16Y – LABETALOL (NORMODYNE®, TRANDATE®)

PARAMEDIC

Class: Anti-Hypertensive (Beta-1, Beta-2, and Alpha-1 Blocker)

Actions/Pharmacodynamics: Adrenergic-receptor blocking agent that combines selective alpha activity and non-selective beta-adrenergic blocking actions. Both activities contribute to reduce blood pressure. Alpha blockade results in vasodilation, decreasing peripheral resistance. Beta blocking effects on sinus node, AV node, and ventricular muscle lead to slower heart rates, delay in AV conduction, and depression of cardiac contractility.

Indications: Hypertensive Emergency (5L)
Complications of Pregnancy (Hypertensive Emergency) (13D)

Contraindications: Asthma (due to beta-2 blockade)
Cardiogenic shock
Uncontrolled congestive heart failure
2nd/3rd degree AV heart block
Sinus bradycardia.

Safe use during pregnancy and children is not firmly established in pharmaceutical studies, though labetalol has been used effectively in pregnancy and in pediatrics.

Pharmacokinetics: Onset is 2-5 minutes IV; peak effects in 5-15 minutes; duration is 2-4 hours; half-life is 3-8 hours.

Side Effects: Dizziness, headache, transient paresthesias (eg. scalp tingling), numbness, postural hypotension, angina, palpitations, bradycardia, syncope, pulmonary edema, dysrhythmias (bradycardias) following IV administration, dyspnea, bronchspasm.

Dosage: **Hypertensive Emergency - Adult (5L)**
Complications of Pregnancy (Hypertensive Emergency) - Adult (13D)
20mg Slow IVP. May repeat 40mg every 10 minutes as needed up to cumulative maximum dose of 300mg.

Hypertensive Emergency - Pediatric (5L)
****OLMC Order Only.** Rarely required.
Typical pediatric dose is 0.3mg/kg up to 1mg/kg, with a max single dose 20mg.

How Supplied: 100mg in a 20mL Multi-Dose Vial (5mg/mL)
(Always check concentration and dose per container at time of patient medication administration)

16Z – LIDOCAINE 2% INTRAVASCULAR (XYLOCAINE®)

EMT-INTERMEDIATE 85	Intraosseous local anesthetic use only - 9I
ADVANCED EMT	Intraosseous local anesthetic use only - 9I
PARAMEDIC	

Class: Intraosseous Local Anesthetic & Antidysrhythmic

Therapeutic Actions/Pharmacodynamics: As a local anesthetic, reduces nerve activation that carries painful stimulus from intraosseous fluid and/or medication administration. As an antidysrhythmic, suppresses ventricular automaticity, chemically converting ventricular tachycardia.

Indications:
Tachycardia - Stable (5F)
Wide complex tachycardia, refractory to amiodarone
****OLMC Order Only**
Vascular Access - Intraosseous (9I)

Contraindications:
Narrow complex tachycardia
Second degree AV Block-Type II (Classic Type)
Third degree AV Block (Complete Heart Block)
Premature ventricular contractions with underlying bradycardias
No indication for IO anesthetic (unresponsive patients)

Pharmacokinetics: Onset of action within 3 minutes IVP/IOP. Duration for 10-20 minutes.

Side Effects: None expected in indicated dosing. Erroneous use in high degree heart blocks can lead to complete ventricular suppression/cardiac arrest.

Dosage:

Tachycardia - Stable - Wide Complex Tachycardia - Adult (5F)
Refactory to Amiodarone
Up to 1 mg/kg, slow IVP/IOP at < 50 mg/minute
****OLMC Order Only**

Tachycardia - Stable - Pediatric (5F)
Consult with OLMCP for use and dosing.

Vascular Access - Intraosseous (Local Anesthetic) - Adult & Pediatric (9I)
1 mg/kg up to 40 mg IOP

How Supplied:
100 mg/5mL (20mg/mL of 2% lidocaine) prefilled syringe.
(Always check concentration and dose per container at time of patient medication administration)

16AA – LIDOCAINE VISCOUS GEL (XYLOCAINE®)

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

Class: Topical Anesthetic

Actions/Pharmacodynamics: Lidocaine stabilizes the neuronal membrane by inhibiting the ionic fluxes required for the initiation and conduction of impulses, thereby effecting local anesthetic action. In gel formulation, additional lubricant effect is possible.

Indications: Nasotracheal Intubation (2I).

Contraindications: Known hypersensitivity to local anesthetics, amide type.

Pharmacokinetics: Onset of action within 3 - 5 minutes.

Side Effects: None expected unless amide anesthetic allergy. In this specific setting, adverse experiences are generally systemic in nature. Cardiovascular manifestations are usually depressant and are characterized by bradycardia, hypotension, and cardiovascular collapse.

Dosage: **Nasotracheal Intubation - Adult (2I)**
Apply gel to the external surface of the endotracheal tube, primarily the distal parts near the balloon cuff and the balloon cuff itself just prior to intubation. Typical use is 1-2 mL of gel.

How Supplied: 2% Viscous Gel (20 mg/mL) - available in foil packs, tubes, pre-filled syringes for topical application, and bottles.
(Always check concentration and dose per container at time of patient medication administration)

Special Comments: Care should be taken to avoid partially occluding the lumen of the endotracheal tube with gel. Do not use the gel to lubricate the endotracheal stylette. Avoid large bottles of lidocaine viscous gel. Attempts to use over multiple patients can result in gel contamination.

16BB – MAGNESIUM SULFATE

PARAMEDIC

Class: Electrolyte

Therapeutic Actions/Pharmacodynamics: As a bronchial smooth muscle relaxant, contributes to reduction of bronchospasm in asthma. As an antidysrhythmic, reverses low circulating magnesium levels associated with ventricular arrhythmias, particularly polymorphic ventricular tachycardia, commonly called torsades des pointes. It is the anticonvulsant of greatest benefit for eclampsia.

Indications:
Dyspnea - Asthma (3C)
Ventricular Fibrillation/Pulseless Ventricular Tachycardia (Torsades) (4G)
Tachycardia - Stable (Torsades) (5F)
Childbirth - Complicated (Eclampsia) (13B)
Complications of Pregnancy (Eclampsia) (13D)

Contraindications: None in indicated situations.

Pharmacokinetics: Onset of action typically within 1-2 minutes after IVP/IOP. Effects persist for up to 30 minutes.

Side Effects: None expected in indicated dosing. High doses (exceeding 4-6 grams) may cause sedation, muscle weakness, depressed reflexes, hypotension, bradycardia, and respiratory depression.

Dosage:

Dyspnea - Asthma - (Severe & Refractory to Nebulization) - Adult (3C)
1 gram very slow IVP over 10 minutes

Ventricular Fibrillation/Pulseless Ventricular Tachycardia (Torsades) - Adult (4G)
1 gram IVP/IOP

Tachycardia - Stable (Torsades) - Adult (5F)
1 gram slow IVP/IOP over 1 minute.
May repeat once.

Tachycardia - Stable (Torsades) - Pediatric (5F)
Consult with OLMCP for use and dosing.

Childbirth - Complicated (Eclampsia) (13B)
Complications of Pregnancy (Eclampsia) (13D)
1 gram IVP/IOP. May repeat every 2-3 mins until seizure abates. Maximum cumulative dose is 4 grams.

PROTOCOL 16BB: Magnesium Sulfate, cont.

How Supplied: 1 gram/2 mL (500 mg/mL in 50% solution) vials
5 grams/10 mL (500 mg/mL in a 50% solution) vials
5 grams/10 mL (50% mg/mL in a 50% solution) pre-filled syringes
(Always check concentration and dose per container at time of patient medication administration)

16CC – METHYLPREDNISOLONE (SOLU-MEDROL®)

PARAMEDIC

Class: Steroid

Actions/Pharmacodynamics: Methylprednisolone is an intermediate-acting synthetic adrenal corticosteroid with glucocorticoid activity. It exerts anti-inflammatory effects in the setting of inflammatory-mediated illness.

Indications: Dyspnea - Asthma (3C)
Dyspnea - Chronic Obstructive Pulmonary Disease (3D)
Acute Allergic Reactions (8A)
Bee/Wasp Stings (8F)

Contraindications and Precautions: Known hypersensitivity to methylprednisolone. In the setting of anaphylaxis, the only true contraindication is prior severe allergy (anaphylaxis) caused by methylprednisolone.

Pharmacokinetics: Onset of action within 4 – 6 hours, may have effect in excess of 24 hours.

Side Effects: None expected immediately. May occasionally see any of the following effects with onset of action: euphoria, insomnia, confusion, psychosis, edema, hypertension, nausea/ vomiting, hyperglycemia.

Dosage:

Dyspnea - Asthma - Adult (3C)
Dyspnea - Chronic Obstructive Pulmonary Disease - Adult (3D)
Acute Allergic Reactions - Adult (8A)
Bee/Wasp Stings - Adult (8F)
125 mg IVP. Give IM if no IV access obtainable.

Dyspnea - Asthma - Pediatric (3C)
Acute Allergic Reactions - Pediatric (8A)
Bee/Wasp Stings - Pediatric (8F)
2 mg/kg not to exceed 125 mg IVP. Give IM if no IV access obtainable.

How Supplied: 125 mg Act-O-Vial™ System (Single Dose Vial)
(Always check concentration and dose per container at time of patient medication administration)

16DD – MIDAZOLAM (VERSED®)

PARAMEDIC

Class: Sedative; Anticonvulsant; Amnestic; Muscle Relaxant, Anxiolytic (Benzodiazepine)

Actions/Pharmacodynamics: Short - acting benzodiazepine with central nervous system depressant, anticonvulsant, anterograde amnestic, muscle relaxant, and anxiolytic effects. Like the other benzodiazepines, it has no effect on pain.

Indications: Medication Assisted Intubation (Pre & Post Intubation Sedation) (2H)
Post Cardiac Arrest Treatment (Hypothermia Induced Shivering Control) (4J)
Transcutaneous Pacing (Sedation) (5E)
Synchronized Cardioversion (Sedation) (5G)
Seizure (6D)
Dystonic Reactions (6F)
Chemical Restraint (7C)
Poisonings - General Management (8A)
Suspected stimulant toxicity = severe agitation, HTN, tachycardia, diaphoresis
Head/Neck/Spine Injury (10A)
Heat Illness (11A)

Contraindications: Patients with intolerance to benzodiazepines, acute narrow - angle glaucoma, shock, or coma. Caution with use in patients with COPD, chronic hepatic or renal failure, CHF, acute alcohol intoxication, and the elderly due to increased risk of respiratory depression.

Pharmacokinetics: Onset is 3-5 minutes, IVP/IOP; 6-14 minutes IN; up to 15 minutes IM (though clinically evident much faster); peak effects in 20-60 minutes. Duration is 2 hours IVP/IOP/IN; 1-6 hours IM; half – life is 1-4 hours.

Side Effects: Retrograde amnesia, headache, euphoria, drowsiness, weakness, excessive sedation, confusion, dizziness, blurred vision, diplopia, nystagmus, respiratory arrest, tachypnea, hypotension, nausea, vomiting.

Dosage:

Medication Assisted Intubation (Pre & Post Intubation Sedation) - Adult (2H)
0.1 mg/kg to max 5 mg IVP/IOP, may repeat once if systolic BP > 100 mmHg

Post Cardiac Arrest Treatment (Hypothermia Induced Shivering Control) - Adult & Pediatric (4J)
0.1 mg/kg to max 5 mg IVP/IOP

Transcutaneous Pacing (Sedation) - Adult (5E)
2 - 5 mg IVP based upon weight and hemodynamics (0.1 mg/kg to max 5 mg)

PROTOCOL 16DD: Midazolam (Versed®), cont.

Dosage, cont.:

Synchronized Cardioversion (Sedation) - Adult (5G)
0.1 mg/kg to max 5 mg IVP/IOP/INP

Seizure - Adult (6D)
Heat Illness - Adult (11A)
0.1 mg/kg to max 5 mg IM/IVP/IN/IOP for active seizure.
May repeat once in 5 minutes if still seizing.

Seizure - Pediatric (6D)
Head/Neck/Spine Injury - Pediatric (10A)
Heat Illness - Pediatric (11A)
0.1 mg/kg to max 5 mg IM/IVP/IN/IOP for active seizure
May repeat once in 5 minutes if still seizing.

Dystonic Reactions - Adult (6F)
2.5 mg IVP/IM/IN

Dystonic Reactions - Pediatric (6F)
0.1 mg/kg to max 2.5 mg IM/IVP/IN

Chemical Restraint - Adult (7C)
0.1 mg/kg to max 5 mg IM/IVP/IN/IOP.
May repeat once.

Chemical Restraint - Pediatric (7C)
0.1 mg/kg to max 5 mg IM/IVP/IN/IOP

Poisoning - General Management (Suspected Stimulant Toxic) - Adult (8A)
0.1 mg/kg to max 5 mg IVP/IN/IM

Poisoning - General Management (Suspected Stimulant Toxic) - Pediatric (8A)
****OLMC Order Only**

Head/Neck/Spine Injury - Adult (10A)
5mg IM/IVP/IN/IOP for active seizure.
May repeat once in 5 minutes if still seizing.

How Supplied: 5 mg/1mL in vials, ampules, or pre-filled syringes.
(Always check concentration and dose per container at time of patient medication administration)

16EE – MORPHINE SULFATE

PARAMEDIC

Class: Narcotic analgesic

Actions/Pharmacodynamics: Stimulates central nervous system opiate receptors, producing systemic analgesia. Modest vasodilation effects increase peripheral venous capacitance, and reduce venous return, myocardial workload, and myocardial oxygen demand.

Indications:
Chest Pain – Uncertain Etiology (5A)
Acute Coronary Syndrome (5C)
Snakebites (8E)
Abdominal Pain/Nausea/Vomiting/Diarrhea (9A)
Pain Management (Acute Onset &Chronic Type) (9D)
Eye Injury (10B)
Dental Injury/Pain (10C)
Chest/Abdomen/Pelvis Injury (10D)
Extremity/Amputation Injury (10G)
Compartment Syndrome (10J)
Crush Injury Syndrome (10K)
Burns (10L)
Lightning/Electrical Injury (11C)
Pelvic Pain (13E)
For all listed situations, indication is acute pain control in alert, hemodynamically stable patient.

Contraindications:
Hypotension
Respiratory Depression
Minor Degrees of Pain
Pain Assessed as Factitious

Side Effects: Hypotension, respiratory depression, euphoria, dizziness. Nausea and/or vomiting are rarely seen if administration is slow IVP. Rapid IVP will lead to an accompanying histamine release, producing the nausea and/or vomiting often erroneously attributed to morphine itself.

Pharmacokinetics: Onset of action within 3-5 minutes after IV administration. Duration of effect can reach 4 hours depending upon end-organ function.

PROTOCOL 16EE: Morphine Sulfate, cont.

Dosage:

Chest Pain – Uncertain Etiology – Adult (5A)
Acute Coronary Syndrome – Adult (5C)
2 mg slow IVP
May repeat every 5 minutes to a maximum cumulative dose of 10 mg

Snakebites – Adult (8E)
Abdominal Pain/Nausea/Vomiting/Diarrhea – Adult (9A)
Pain Management (Acute Onset &Chronic Type) – Adult (9D)
Eye Injury – Adult (10B)
Dental Injury/Pain – Adult (10C)
Chest/Abdomen/Pelvis Injury – Adult (10D)
Extremity/Amputation Injury – Adult (10G)
Compartment Syndrome – Adult (10J)
Crush Injury Syndrome – Adult (10K)
Burns – Adult (10L)
Lightning/Electrical Injury – Adult (11C)
Pelvic Pain – Adult (13E)
For all listed situations, indication is acute pain control in alert, hemodynamically stable patient.
2 – 4 mg slow IVP
May repeat every 5 minutes to a maximum cumulative dose of 10 mg

Chest Pain – Uncertain Etiology – Pediatric (5A)
Snakebites – Pediatric (8E)
Abdominal Pain/Nausea/Vomiting/Diarrhea – Pediatric (9A)
Pain Management (Acute Onset &Chronic Type) – Pediatric (9D)
Eye Injury – Pediatric (10B)
Dental Injury/Pain – Pediatric (10C)
Chest/Abdomen/Pelvis Injury – Pediatric (10D)
Extremity/Amputation Injury – Pediatric (10G)
Compartment Syndrome – Pediatric (10J)
Crush Injury Syndrome – Pediatric (10K)
Burns – Pediatric (10L)
Lightning/Electrical Injury – Pediatric (11C)
Pelvic Pain – Pediatric (13E)
For all listed situations, indication is acute pain control in alert, hemodynamically stable patient
****OLMC Order Only** – Typical dose is 0.1 mg/kg up to 2 mg per dose.

How Supplied:

2 mg/1 mL pre-filled syringe
4mg/1 mL vial, ampule, or pre-filled syringe
8 mg/1 mL pre-filled syringe
10 mg/1 mL vial
10 mg/10 mL vial
(Always check concentration and dose per container at time of patient medication administration)

16FF – NALOXONE (NARCAN®)

ADVANCED EMT

PARAMEDIC

Class: Narcotic antagonist

Actions/Pharmacodynamics: The primary action of interest is reversal of respiratory depression associated with narcotic agents. Naloxone competes with and displaces narcotic substances from opiate receptors.

Indications:
Respiratory Arrest (3A)
Specific Causes of Cardiac Arrest (4I)
Altered Mental Status (6B)
Syncope (6E)
Poisonings – General Management (8A)

Contraindications: Known or suspected narcotic substance use or abuse without cardiopulmonary compromise. Post-intubation in known or suspected narcotic substance use or abuse situations. Avoid whenever possible in known or suspected narcotic addicts. In these patients, use the smallest clinically effective dose possible (titrating administration slowly) to avoid acute narcotic withdrawal.

Pharmacokinetics: Onset of action within 2 minutes after IVP/IOP/IN administration with duration of effect up to 2 hours.

Side Effects: Agitation, anxiety, diaphoresis, tachycardia, nausea, vomiting, headache, hypertension, hypotension, seizures.

Dosage:

Respiratory Arrest - Adult (3A)
Specific Causes of Cardiac Arrest - Adult (4I)
Altered Mental Status – Adult (6B)
Syncope – Adult (6E)
Poisonings – General Management – Adult (8A)
In Apnea/Agonal Breathing, 2 mg IVP/IOP/IN.
May repeat once to maximum cumulative dose of 4mg.

In Ineffective Breathing Activity, 0.5 mg IVP/IOP/IN.
May repeat to a maximum cumulative dose of 4 mg.

PROTOCOL 16FF: Naloxone (Narcan®), cont.

Dosage, cont.:

Respiratory Arrest - Pediatric (3A)
Specific Causes of Cardiac Arrest - Pediatric (4I)
Altered Mental Status – Pediatric (6B)
Syncope – Pediatric (6E)
Poisonings – General Management – Pediatric (8A)
In Apnea/Agonal Breathing, 0.5 mg IVP/IOP/IN.
May repeat to a maximum cumulative dose of 2 mg.

In Ineffective Breathing Activity, 0.5 mg IVP/IOP/IN.
May repeat to a maximum cumulative dose of 2 mg.

How Supplied:

0.4 mg/1 mL vial
0.4 mg/1 mL prefilled syringe
2mg/2mL prefilled syringe
4 mg/10 mL vial
(Always check concentration and dose per container at time of patient medication administration)

Special Comment: In non-respiratory arrest or non-cardiac arrest situations, always titrate administration slowly, using the lowest clinically effective amount of naloxone possible to avoid inadvertent acute narcotic withdrawal and/or other side effects.

16GG – HYDROMORPHONE (DILAUDID®)

PARAMEDIC

Class: Narcotic analgesic

Actions/Pharmacodynamics: Stimulates central nervous system opiate receptors, producing systemic analgesia. Modest vasodilation effects increase peripheral venous capacitance, and reduce venous return, myocardial workload, and myocardial oxygen demand. Hydromorphone is roughly 10 times more potent than morphine. An IV dose of 1 mg of hydromorphone is equivalent to an IV dose of 10 mg of morphine.

Indications:
Chest Pain – Uncertain Etiology (5A)
Acute Coronary Syndrome (5C)
Snakebites (8E)
Abdominal Pain/Nausea/Vomiting/Diarrhea (9A)
Pain Management (Acute Onset &Chronic Type) (9D)
Eye Injury (10B)
Dental Injury/Pain (10C)
Chest/Abdomen/Pelvis Injury (10D)
Extremity/Amputation Injury (10G)
Compartment Syndrome (10J)
Crush Injury Syndrome (10K)
Burns (10L)
Lightning/Electrical Injury (11C)
Pelvic Pain (13E)
For all listed situations, indication is acute pain control in alert, hemodynamically stable patient.

Contraindications:
Hypotension
Respiratory Depression
Minor Degrees of Pain
Pain Assessed as Factitious

Side Effects: Hypotension, respiratory depression, euphoria, dizziness. Nausea and/or vomiting are rarely seen if administration is slow IVP. Rapid IVP will lead to an accompanying histamine release, producing the nausea and/or vomiting often erroneously attributed to hydromorphone itself.

Pharmacokinetics: Onset of action within 5-10 minutes after IV administration. Duration of effect can reach 4 - 6 hours depending upon end-organ function.

PROTOCOL 16GG: Hydromorphone (Dilaudid®), cont.

Dosage:

Chest Pain – Uncertain Etiology – Adult (5A)
Acute Coronary Syndrome – Adult (5C)
0.25 mg slow IVP
May repeat every 10 minutes to a maximum cumulative dose of 1 mg

Snakebites – Adult (8E)
Abdominal Pain/Nausea/Vomiting/Diarrhea – Adult (9A)
Pain Management (Acute Onset &Chronic Type) – Adult (9D)
Eye Injury – Adult (10B)
Dental Injury/Pain – Adult (10C)
Chest/Abdomen/Pelvis Injury – Adult (10D)
Extremity/Amputation Injury – Adult (10G)
Compartment Syndrome – Adult (10J)
Crush Injury Syndrome – Adult (10K)
Burns – Adult (10L)
Lightning/Electrical Injury – Adult (11C)
Pelvic Pain – Adult (13E)
For all listed situations, indication is acute pain control in alert, hemodynamically stable patient.
0.5 – 1 mg slow IVP
May repeat every 10 minutes to a maximum cumulative dose of 2 mg

Chest Pain – Uncertain Etiology – Pediatric (5A)
Snakebites – Pediatric (8E)
Abdominal Pain/Nausea/Vomiting/Diarrhea – Pediatric (9A)
Pain Management (Acute Onset &Chronic Type) – Pediatric (9D)
Eye Injury – Pediatric (10B)
Dental Injury/Pain – Pediatric (10C)
Chest/Abdomen/Pelvis Injury – Pediatric (10D)
Extremity/Amputation Injury – Pediatric (10G)
Compartment Syndrome – Pediatric (10J)
Crush Injury Syndrome – Pediatric (10K)
Burns – Pediatric (10L)
Lightning/Electrical Injury – Pediatric (11C)
Pelvic Pain – Pediatric (13E)
For all listed situations, indication is acute pain control in alert, hemodynamically stable patient
****OLMC Order Only** – Typical dose is 0.01 mg/kg up to 0.5 mg per dose.

How Supplied: 2 mg/1 mL vial or pre-filled syringe
(Always check concentration and dose per container at time of patient medication administration)

16HH – NOREPINEPHRINE (LEVOPHED®)

PARAMEDIC

Class: Vasoconstrictor

Actions/Pharmacodynamics: Stimulates alpha receptors in the peripheral vasculature, producing vasoconstriction-related increase in systemic blood pressure. Concurrent beta receptor stimulation may produce increases in heart rate and mild bronchodilation, though norepinephrine is a weaker beta stimulator than dopamine.

Indications: Post Cardiac Arrest Treatment (Cardiogenic Shock) (4J)
Fever (Septic Shock) (9B)
Dialysis-Related Issues (9E)
For all listed situations, indication is hypotension (adult = systolic < 100 mmHg) due to cardiogenic, septic, or neurogenic shock either refractory to intravascular fluid boluses or in which intravascular fluid bolusing is contraindicated (eg. pulmonary edema).

Contraindications: Hypertension

Pharmacokinetics: Onset of action within 5 minutes after IV/IO infusion initiated. Rapid metabolism, requiring ongoing IV/IO infusion to maintain clinical effects.

Side Effects: Few, though at higher doses, symptoms may include headache, palpitations, tachycardia, chest pain, and eventual hypertension. Bradycardia can result reflexively from an increase in blood pressure.

Dosage: **Post Cardiac Arrest Treatment - Cardiogenic Shock - Adult (4J)**
Fever - Septic Shock - Adult (9B)
Dialysis-Related Issues - Adult (9E)
For hypotension (shock) refractory to fluids or fluids contraindicated
Start at 2-4mcg/minute - see dosage chart - titrated to a systolic B/P ≥ 100 mmHg. Maximum infusion rate is 12mcg/minute.

Norepinephrine Infusion Adult Dosage Chart
rates reflect using a microdrip (60 drops/mL) set:

mcg/min	2	3	4	5	6	7	8	9	10	11	12
drops/min	15	22	30	37	45	52	60	67	75	82	90

PROTOCOL 16HH: Norepinephrine (Levophed®), cont.

Dosage, cont.: **Post Cardiac Arrest Treatment - Cardiogenic Shock - Pediatric (4J)**
Fever - Septic Shock - Pediatric (9B)
Dialysis-Related Issues - Pediatric (9E)
For hypotension (shock) refractory to fluids or fluids contraindicated
****OLMC Order Only**

How Supplied: 4 mg/4 mL ampule or vial.
Use only 2 mL in a 250 mL bag of D5W.
(8 mcg/mL concentration)
(Always check concentration and dose per container at time of patient medication administration)

Special Comments: In the setting of tachydysrhythmia-induced cardiogenic shock, treat per Protocol 5G – Tachycardia - Unstable. Ensure aggressive fluid resuscitation is accomplished (unless contraindicated) prior to norepinephrine use.

Norepinephrine should be given into a large, patent vein. The vein of choice for EMS use is the antecubital vein, as this will decrease the risk of overlying skin necrosis. Do not administer norepinephrine through an IV in the hand or leg. These veins are more likely to be affected by vaso-occlusive diseases and more prone to ischemic complications. Administration through IO in the proximal tibia or humeral head is permitted.

If local extravasation occurs, notify the receiving physician of the following FDA advisement of antidote to extravasation ischemia:

"To prevent sloughing/necrosis in peripheral ischemic areas promptly use syringe w/ fine hypodermic needle to liberally infiltrate area w/ 10-15 mL saline solution containing 5-10 mg phentolamine; sympathetic blockade causes immediate conspicuous local hyperemic changes if area infiltrated within 12 hours."

Safety in pregnancy not firmly established, though when clinically indicated the benefits outweigh risks. Safety in pediatrics not firmly established and OLMC is to be consulted prior to pediatric usage.

Avoid mixing in normal saline, as NS promotes loss of potency through oxidation of norepinephrine.

16II – ONDANSETRON (ZOFRAN®)

PARAMEDIC

Class: Antiemetic

Actions/Pharmacodynamics: Ondansetron reduces the activity of the vagus nerve, which activates the vomiting center in the medulla oblongata, and also blocks serotonin receptors in the chemoreceptor trigger zone. It has little effect on vomiting caused by motion sickness.

Indications:
Snakebites (8E)
Abdominal Pain/Nausea/Vomiting/Diarrhea (9A)
Fever (9B)
Pelvic Pain (13E)
For all listed situations, indication is for impending/active vomiting.

Contraindications:
Known hypersensitivity to ondansetron
Current use of Apomorphine (Apokyn®), an anti – parkinsonian drug

Use with caution with patients currently using medications which effect QT interval (eg. procainamide, amiodarone, tricyclic antidepressants, haloperidol)

Side Effects: Sedation, dystonic reactions (rare), hypotension, tachycardia, angina, torsades (rare).

Dosage:

Snakebites - Adult (8E)
Abdominal Pain/Nausea/Vomiting/Diarrhea - Adult (9A)
Fever - Adult (9B)
Pelvic Pain - Adult (13E)
For all listed situations, indication is for impending/active vomiting.
4 mg oral dissolving tablet on tongue, may repeat once in 10 minutes
4 mg slow IVP over 60 seconds, may repeat once in 10 minutes

Snakebites - Pediatric (8E)
Abdominal Pain/Nausea/Vomiting/Diarrhea - Pediatric (9A)
Fever - Pediatric (9B)
Pelvic Pain - Pediatric (13E)
For all listed situations, indication is for impending/active vomiting.
If age > 2 years, 4 mg oral dissolving tablet on tongue
0.1 mg/kg to max of 4 mg slow IVP over 60 seconds

How Supplied:
4 mg/2 mL (2 mg/mL) vial.
4 mg rapid oral dissolving tablet (ODT)
(Always check concentration and dose per container at time of patient medication administration)

16JJ – PHENYLEPHRINE 2% (NEOSYNEPHRINE®)

EMT
EMT-INTERMEDIATE 85
ADVANCED EMT
PARAMEDIC

Active epistaxis only - 9C

Class: Topical Nasal Vasoconstrictor

Actions/Pharmacodynamics: Phenylephrine is a direct-acting sympathomimetic amine. It stimulates alpha receptors in the blood vessels of the nasal mucosa which causes their constriction, thereby decreasing the risk of subsequent nasal bleeding.

Indications: Nasal Intubation (2I)
Epistaxis (9C)

Contraindications: None in the indicated settings.

Pharmacokinetics: Onset of action is within seconds.

Side Effects: Rare with single dose. It is rarely absorbed systemically from nasal instillation.

Dosage:

Nasal Intubation - Adult (2I)
2 sprays in each nostril

Epistaxis - Adult & Pediatric (9C)
2 - 4 sprays in affected nostril(s) for control of epistaxis (with compression of nose immediately after administration)

How Supplied: Phenylephrine Nasal Spray 1% solution, 15 mL squeeze bottle for single patient use only.
(Always check concentration and dose per container at time of patient medication administration)

16KK – PRALIDOXIME CHLORIDE (2PAM)

PARAMEDIC

Class: Cholinesterase Reactivator

Actions/Pharmacodynamics: **Pralidoxime chloride** reactivates cholinesterase (mainly outside the central nervous system) which has been inactivated by an organophosphate pesticide. The destruction of accumulated acetylcholine can then proceed and neuromuscular junctions will regain function. Pralidoxime chloride has its most critical effect in reversing paralysis of the muscles of respiration. Because Pralidoxime Chloride is less effective in relieving depression of the respiratory center, atropine is always required concomitantly to block the effect of accumulated acetylcholine at the site. Pralidoxime Chloride is short acting and repeated doses may be needed, especially when there is evidence of continuing toxicity.

Indications: Poisonings – General Management (8A)

Contraindications: None

Pharmacokinetics: With IM autoinjector use, effects may not be observed for up to 15 minutes. Beneficial effects can persist in excess of 1 hour.

Side Effects: Headache, dizziness, vision changes, loss of coordination, laryngospam, tachycardia, palpitations.

Dosage:

Poisonings – General Management - Adult & Pediatric > 12 years of age (8A)
600 mg IM
May repeat every 15 minutes to cumulative maximum dose of 1800 mg.
In the setting of serious symptoms (cardiopulmonary distress), repeat doses in rapid succession.

Poisonings – General Management - Pediatric ≤ 12 years of age (8A)
****OLMC Order Only**
Typical pediatric dose is 15 mg/kg IM per dose, max single dose 600 mg

How Supplied: 600 mg/2 mL autoinjector
(Always check concentration and dose per container at time of patient medication administration)

16LL – SODIUM BICARBONATE

PARAMEDIC

Class: Alkalinizing agent

Actions/Pharmacodynamics: Raises the pH of blood by buffering excess hydrogen ions that are present in acidotic states. The role of sodium bicarbonate is limited in cardiac arrest. Because ventilation is an effective tool in managing respiratory acidosis, sodium bicarbonate should rarely be administered for cardiac arrest, unless the arrest is suspected to be secondary to hyperkalemia, a preexisting metabolic acidosis, or a tricyclic antidepressant over ingestion.

Indications:
Specific Causes of Cardiac Arrest (Hyperkalemia) (4I)
Poisonings – General Management (Tricyclic Antidepressant) (8A)
Dialysis-Related Issues (Hyperkalemia) (9E)
Crush Injury Syndrome (Hyperkalemia Prophylaxis) (10K)

Contraindications: Known metabolic alkalosis.

Pharmacokinetics: Onset of effect is observed within 3-5 minutes after IVP/IOP administration.

Side Effects: Sodium bicarbonate may inhibit oxygen release secondary to a shift in oxyhemoglobin saturation. It also may produce a paradoxical acidosis that can depress cerebral and cardiac function. Severe soft tissue damage can occur in extravasated administrations.

Dosage:
Specific Causes of Cardiac Arrest – Hyperkalemia - Adult & Pediatric (4I)
Poisonings – General Management – Tricyclic Antidepressants - Adult & Pediatric (8A)
Dialysis-Related Issues – Hyperkalemia - Adult & Pediatric (9E)
Crush Injury Syndrome – Hyperkalemia Prophylaxis - Adult & Pediatric (10K)
1mEq/kg IVP/IOP with maximum dose of 50mEq

How Supplied: 50meq/50 mL (1 mEq/mL) prefilled syringe.
(Always check concentration and dose per container at time of patient medication administration)

Special Comment: Do not administer with calcium chloride. A precipitate will form and obstruct the vascular access being utilized.

16MM – LORAZEPAM (ATIVAN®)

PARAMEDIC

Class: Sedative; Anticonvulsant; Muscle Relaxant; Anxiolytic (Benzodiazepine)

Actions/Pharmacodynamics: Long - acting benzodiazepine with central nervous system depressant, anticonvulsant, muscle relaxant, and anxiolytic effects. Like the other benzodiazepines, it has no effect on pain. Ativan has less muscle relaxant properties than diazepam, though no substantial amnestic effects as with midazolam.

Indications: Medication Assisted Intubation (2H)
Post-intubation sedation - onset delay does not favor pre-intubation use
Seizure (6D)
(Midazolam preferred benzodiazepine due to faster onset of action)
Dystonic Reactions (6F)
Chemical Restraint (7C)
(Midazolam preferred benzodiazepine due to faster onset of action)
Poisonings - General Management (8A)
Suspected stimulant toxicity = severe agitation, HTN, tachycardia, diaphoresis
Head/Neck/Spine Injury (10A)
(Midazolam preferred benzodiazepine due to faster onset of action)
Heat Illness (11A)
(Midazolam preferred benzodiazepine due to faster onset of action)

Contraindications: Patients with intolerance to benzodiazepines, acute narrow - angle glaucoma, shock, or coma. Caution with use in patients with COPD, chronic hepatic or renal failure, CHF, acute alcohol intoxication, and the elderly due to increased risk of respiratory depression.

Pharmacokinetics: Onset is 5-10 minutes, IVP/IOP; up to 30 minutes IM; peak effects in 2-3 hours. Duration is 3-6+ hours IVP/IOP/IM; half – life can reach 20 – 50 hours.

Side Effects: Headache, euphoria, drowsiness, excessive sedation, confusion, dizziness, blurred vision, diplopia, nystagmus, respiratory arrest, hypotension, nausea, vomiting.

Dosage: **Medication Assisted Intubation (Post Intubation Sedation) - Adult (2H)**
0.1 mg/kg to max 2 mg IVP/IOP, may repeat once if systolic BP > 100 mmHg

Seizure - Adult (6D)
Heat Illness - Adult (11A)
2 mg IVP/IOP/IM for active seizure
May repeat once in 10 minutes if still seizing.

PROTOCOL 16MM: Lorazepam (Ativan®), cont.

Dosage, cont.:

Seizure - Pediatric (6D)
Heat Illness - Pediatric (11A)
0.1 mg/kg to max 2 mg IVP/IOP/IM for active seizure
May repeat once in 5 minutes if still seizing.

Dystonic Reactions - Adult (6F)
2 mg IVP/IM

Dystonic Reactions - Pediatric (6F)
0.1 mg/kg to max 2 mg IVP/IM

Chemical Restraint - Adult (7C)
2 mg IVP/IOP/IM
May repeat once.

Chemical Restraint - Pediatric (7C)
0.1 mg/kg to max 2 mg IVP/IOP/IM

Poisoning - General Management (Suspected Stimulant Toxic) - Adult (8A)
1 -2 mg IVP/IM

Poisoning - General Management (Suspected Stimulant Toxic) - Pediatric (8A)
****OLMC Order Only**

Head/Neck/Spine Injury - Adult (10A)
1 mg IVP/IM/IOP for active seizure.
May repeat once in 5 minutes if still seizing.

Head/Neck/Spine Injury - Pediatric (10A)
0.1 mg/kg IVP/IM/IOP for active seizure.
May repeat once in 5 minutes if still seizing.

How Supplied: 2 mg/1 mL or 4 mg/1mL in vials, ampules, or pre-filled syringes. (Always check concentration and dose per container at time of patient medication administration)

Special Comment: Lorazepam must be kept refrigerated.

SECTION 17

RESERVED FOR AGENCY SPECIFIC USE

SECTION 18

RESERVED FOR AGENCY SPECIFIC USE- PILOT PROGRAMS RESEARCH

SECTION 19

APPENDICES

ABBREVIATIONS

A

A	ACTIVATE
ABC	AIRWAY, BREATHING, AND CIRCULATION
ABD	ABDOMEN
AC	ASSIST/CONTROL
ACIP	ADVISORY COMMITTEE ON IMMUNIZATION PRACTICES
ACS	ACUTE CORONARY SYNDROME
AED	AUTOMATIC EXTERNAL DEFIBRILLATOR
AEMT	ADVANCED EMERGENCY MEDICAL TECHNICIAN
AEV	AUTOMATIC EMERGENCY VENTILATOR
AHA	AMERICAN HEART ASSOCIATION
AICD	AUTOMATIC IMPLANTABLE CARDIOVERTER/DEFIBRILLATOR
ALS	ADVANCED LIFE SUPPORT
ALTE	APPARENT LIFE THREATENING EVENT
AMS	ALTERED MENTAL STATUS
ASA	ASPIRIN
ASAP	AS SOON AS POSSIBLE
AST	AMBULANCE STRIKE TEAM
AUTO-CAL	AUTOMATIC CALIBRATION
AV	ATRIOVENTRICULAR

B

B	BACK PLATE
bAd CbL	DEFECTIVE CABLE
BID	TWICE A DAY
BiCPAP	BI-LEVEL/CONTINUOUS POSITIVE AIRWAY PRESSURE
BiPAP	Bi-LEVEL POSTIVE AIRWAY PRESSURE
BiVAD	Bi-LEVEL VENTRICULAR ASSIST DEVICE
BP	BLOOD PRESSURE
BPM	BLOOD PRESSURE MONITOR
BSA	BODY SURFACE AREA
BVM	BAG VALVE MASK
BURP	BACKWARD, UPWARD, RIGHTWARD PRESSURE

C

C °	CELSIUS
C	COMPRESSION
CAB	CIRCULATION, AIRWAY, AND BREATHING
C-A-T	COMBAT-APPLICATION-TOURNIQUET
Cbl	CABLE
CDC	CENTERS FOR DISEASE CONTROL
CHF	CONGESTIVE HEART FAILURE
CM	CENTIMETER
CN	CHLORACETOPENONE

CNS	CENTRAL NERVOUS SYSTEM
CO	CARBON MONOXIDE
CO2	CARBON DIOXIDE
COPESSOS	C-CLAMP, OROPHARYNGEAL AND/OR NASOPHARYNGEAL AIRWAY(S), PLACE IN SNIFFING POSITION, ELEVATE THE JAW, SEAL THE MASK, SELLICK MANEUVER, OXYGEN, SQUEEZE THE BAG SLOWLY AND SMOOTHLY
COPD	CHRONIC OBSTRUCTIVE PULMONARY DISEASE
CPAP	CONTINUOUS POSITIVE AIRWAY PRESSURE
CPC	CONTROLLER POWER CABLE
CPR	CARDIOPULMONARY RESUSCITATION
CS	CHLOROBENZYLIDENEMALONONITRILE

D

D	DEPTH
D50	DEXTROSE 50%
DCAPP-BLS	DEFORMITIES, CONTUSIONS, ABRASIONS, PUNCTURES, PENETRATIONS, BURNS, LACERATIONS, SWELLING
Dia BP	DIASYSTOLIC BLOOD PRESSURE
dl	DECILITER
DNR	DO NOT RESUSCITATE
D.O.	DOCTOR OF OSTEOPATHY
DOT	DEPARTMENT OF TRANSPORTATION

E

E	ENGAGE
ECG	ELECTROCARDIOGRAM
ED	EMERGENCY DEPARTMENT
ED	EMERGENCY DESTINATION
EMD	EMERGENCY MEDICAL DISPATCHER
EMR	EMERGENCY MEDICAL RESPONDER
EMS	EMERGENCY MEDICAL SERVICES
EMT	EMERGENCY MEDICAL TECHNICIAN
EMT-I 85	EMERGENCY MEDICAL TECHNICIAN-INTERMEDIATE 1985
EOC	EMERGENCY OPERATIONS CENTER
EOD	EMERGENCY OF DENTENTION
EOD	EMERGENCY ORDER OF DETENTION
EPAP	END POSITIVE AIRWAY PRESSURE
ERG	EMERGENCY RESPONSE GUIDEBOOK
Err	ERROR
ESF-8	EMERGENCY SUPPORT FUNCTION-8
ETA	ESTIMATED TIME OF ARRIVAL
EtCO2	END-TIDAL CARBON DIOXIDE
ETOH	ETHANOL
ETT	ENDOTRACHEAL TUBE

F

F°	FAHRENHEIT
F	FOLLOW-UP
FDA	FOOD AND DRUG ADMINISTRATION
FFP	FROZEN PLASMA
FiO2	FRACTION OF INSPIRED OXYGEN
FT	FEET OR FOOT

G

GCS	GLASGOW COMA SCALE
G	GRAM
Gm	GRAM

H

HBO	HYPERBARIC OXYGEN
HEMS	HELICOPTER EMERGENCY MEDICAL SERVICE
HIV	HUMAN IMMUNODEFICIENCY VIRUS
HME	HEAT MOISTURE EXCHANGER
H2O	WATER
HR	HOUR
HTN	HYPERTENSION
HX	HISTORY

I

IABP	INTRA-AORTIC BALLON PUMP
ICD	IMPLANTABLE CARDIOVERTER DEFIBRILLATOR
ICS	INCIDENT COMMAND STRUCTURE
ID	IDENTIFICATION
I:E	INSPIRATORY TO EXPIRATORY RATIO
IM	INTRAMUSCULAR
IN	INTRA NASAL
INH	ISONIAZID
INP	INTRA NASAL PUSH
IO	INTRAOSSEOUS
IOP	INTRAOSSEOUS PUSH
IOPB	INTRAOSSEOUS PIGGY BACK
IPAP	INSPIRATORY POSITIVE AIRWAY PRESSURE
IV	INTRAVENOUS
IVF	INTRAVENOUS FLUSH
IVP	INTRAVENOUS PUSH
IVPB	INTRAVENOUS PIGGY BACK

J

J	JOULES

K

KCL	POTASSIUMCHLORIDE
kg	KILOGRAM
KPA	KILOPASCAL

L

L	LITER
LA	LEFT ARM
LAPSS	LOS ANGELES PREHOSPITAL STROKE SCALE
LED	LIGHT-EMITTING DIODE
LEMON	LOOK, EVALUATE, MALLAMPATI, OBSTRUCTIONS, NECK MOBILITY
LL	LEFT LEG
LOC	LOSS OF CONSCIOUSNESS
lpm	LITERS PER MINUTE
LVAD	LEFT VENTRICULAR ASSIST DEVICE

M

mA	milliAmp
MACC	MULTIPLE AGENCY COORDINATION CENTER
MAX	MAXIMUM
mcg	MICROGRAM
MCI	MASS CASALITY INCIDENT

M.D.	MEDICAL DOCTOR
mEq	MILIEQUIVALENT
MERC	MEDICAL EMERGENCY RESPONSE CENTER
mg	MILLIGRAM
MI	MYOCARDIAL INFARCTION
MIN	MINUTE
mL	MILLILITER
mm	MILLIMETER
mm ID	MILLIMETER INNER DIAMETER
mm OD	MILLIMETER OUTER DIAMETER
mmHG	MILLIMETERS OF MERCURY
MOI	MECHANISM OF INJURY
mph	MILES PER HOUR

N

NC	NASAL CANULA
NFPA	NATIONAL FIRE PROTECTION AGENCY
NIPPV	NON-INVASIVE POSITIVE PRESSURE VENTILATION
NPA	NASAL PHARYNGEAL AIRWAY
NPO	NOTHING BY MOUTH
NPPV	NON-POSITIVE PRESSURE VENTILATION
NRB	NON REBREATHER MASK
NS	NORMAL SALINE

NTG	NITROGLYCERIN

O

O2	OXYGEN
ODT	ORAL DISOLVING TABLET
OEM	OFFICE OF EMERGENCY MANAGEMENT
OLMC	ON-LINE MEDICAL CONTROL
OLMCP	ON-LINE MEDICAL CONTROL PHYSICIAN
OPA	ORAL PHAARYNGEAL AIRWAY
OPCC	OKLAHOMA POISON CONTROL CENTER
OSDH	OKLAHOMA STATE DEPARTMENT OF HEALTH
OSU	OKLAHOMA STATE UNIVERSITY
O2 SAT	OXYGEN SATURATION
OU	OKLAHOMA UNIVERSITY
OX	OXIMETRY

P

5 P'S	PAIN, PARESTHESIA, PRESSURE, PARALYSIS, PULSELESSNESS
P	PRESSURE
PBU	POWER BATTERY UNIT
PEA	PULSELESS ELECTRICAL ACTIVITY
PEEP	POSITIVE END-EXPIRATORY PRESSURE
PEG/G/J	PEB TUBE/GASTRIC TUBE/JEJUNOSTOMY TUBE
PEP	POST-EXPOSURE PROPHYLAXIS

PICC	PERIPHERLLY INSERTED CENTRAL CATHETER
PI	PERFUSION INDICATOR
PIP	PEAK AIRWAY PRESSURE
PO	BY MONTH
PPV	POSITIVE PRESSURE VENTILATION
PRBC	PACKED RED BLOOD CELLS
PRN	AS NEEDED
Psi	POUNDS PER SQUARE INCH
PS	PRESSURE SUPPORT
PSVT	PAROXYSMAL SUPRAVENTRICULAR TACHYCARDIA
PT	PATIENT
PVC	PEMATURE VENTRICULAR CONTRACTION

Q

QRS	THE DEFLECTIONS IN AN ELECTROCARDIOGRAM THAT REPRESENTS ELECTRICAL ACTIVITY GENERATED BY VENTRICULAR DEPOLARIZATION

R

RA	RIGHT ARM
REMSS	REGIONAL MEDICAL SERVICE SYSTEM
RESP	RESPIRATIONS
RL	RIGHT LEG
RN	REGISTERED NURSE
ROSC	RETURN OF SPONTANEOUS CIRCULATION
RVAD	RIGHT VENTRICULAR ASSIST DEVICE

S

SA	SINOATRIAL
SBP	SYSTOLIC BLOOD PRESSURE
SEN	SENSOR
SIQ	SIGNAL I.Q.
SL	SUBLINGUAL
SOB	SHORTNESS OF BREATH
SpCO	CARBOXYHEMOGLOBIN
SpO2	OXYGEN SATURATION OF ARTIAL BLOOD
ST	THE PART OF AN ELECTROCARDIOGRAM IMMEDIATELY FOLLOWING THE QRS COMPLEX MERGING INTO THE T WAVE
STEMI	SEGMENT ELEVATION MYOCARDIAL INFARCTION
SubQ	SUBCUTANEOUS
SYS BP	SYSTOLIC BLOOD PRESSURE

T

TAH	TOTAL ARTIFICAL HEART
TB	TUBERCULOSIS
TBSA	TOTAL BODY SURFACE AREA
TCA	TRICYCLIC ANTIDEPRESSANTS
TEMP	TEMPERATURE
TKO	TO KEEP OPEN
tPA	ALTEPLASE
TREC	TRAUMA REFERRAL CENTER

U	U.S.	UNITED STATES
V		
	V	VOLUME
	VAD	VENTRICULAR ASSIST DEVICE
	VS	VITAL SIGNS
	VT	VENTRICULAR TACHYCARDIA
	Vt	VOLUME TIMING
W	WISER	WIRELESS INFORMATION SYSTEM FOR EMERGENCY RESPONDERS
X		
Y		
Z		

INSTRUCTIONS
Oklahoma State Department of Health
Communicable Disease Risk Exposure Report

This report form was developed to initiate a system of notification for risk exposures occurring outside of a health care facility to health care workers, emergency responders, and funeral workers as specified by the Oklahoma State Department of Health OAC 310:555. This report and all information entered on it are to be held in strictest confidence to conform with 63 O.S. Supp. 2001, Section 1-502.1 et. seq.

Note: For questions regarding the handling of ODH Form 207, call 405/271-4636.

PART I: Exposed Worker Section

Questions 1-13 are to be completed by the exposed worker, immediately following the injury.

11: Describe exposure in detail. Include information regarding type of exposure, body part affected, type of body fluid involved, duration of exposure, etc.

13: List the facility where the source patient was taken. This will be the facility that is responsible for testing the source patient.

Questions 14-19 are to be completed by Employer's Designee, immediately following the injury.

Questions 20-22 are to be completed by a Licensed Health Care Professional. (MD, DO, RN, PA,).

Routing:

A. If the Licensed Health Care Professional determines that the exposure does not have the potential for transmission of a communicable disease, the form should be returned to the Employer's Designee.

B. If the exposure does have the potential for transmission of a communicable disease, the ***Yellow*** copy should be mailed ***immediately*** to the OSDH HIV/STD Service (use gray, self addressed, metered envelope).

The ***Green*** copy, a gray metered envelope and instruction page are to be delivered ***immediately*** to the designated person (usually the Infection Control Practitioner) at the health care facility to which the source patient was transported; to the attending physician, if the source patient was being cared for outside of a health care facility; to the health care provider who last had responsibility for the deceased source patient; or to the medical examiner.

PART II: Source Patient Health Care Provider Section

Questions 23-38 are to be completed by the Health Care Provider who is responsible for testing the source patient.

32. Rapid HIV testing has become a valuable tool used to quickly determine the need for initiation and/or continuation of PEP meds for the exposed person. When a rapid HIV test is performed on the source patient, communication of these results should not be delayed. The results should be **immediately** communicated to the physician/provider who is providing post-exposure counseling and follow up and is listed on page 1, q. 17-19.

    Please note that as other source results become available, these should be released to the Provider listed on page 1, q. 17-19.

Routing:

A. The Health Care Provider should complete Part II and mail the completed green form to OSDH HIV/STD Service immediately using the gray, self-addressed, metered envelope.

PART II: Source Patient Health Care Provider Section *(Please Print)*

23. Date and time Communicable Disease Risk Exposure Report received: (Mo./Day/Yr.) _____/_____/_____ Time: _____AM or PM (Circle One)

24. Person completing Part II: _____
(Last) (First) (Title)

25. Institution (name): _____ Business Phone: (_____)_____

Source Patient Information

26. Birth date: (Mo./Day/Yr.) _____/_____/_____ 27. Sex: ☐ **Male;** ☐ **Female**

28. Primary Diagnoses: _____

29. Was the source patient found to have any potentially communicable disease(s), such as hepatitis B, hepatitis C, HIV, TB, meningococcal disease, or others? ☐ **Yes** ☐**No**

30. If yes, specify: _____

31. Does the source patient have clinical evidence of AIDS or symptoms of HIV infection or acute retroviral syndrome?☐**Yes;** ☐ **No;** ☐**Unknown**

Source Patient Test Results

32. Rapid HIV test: ☐**Positive;** ☐**Negative;** ☐ **Indeterminant** Test Date: (Mo./Day/Yr.) _____/_____/_____ ☐**Not Done**

Note: IMMEDIATELY report Rapid HIV results by phone or fax to the Provider listed on page 1, q. 17-19. As other test results become available, these are also to be released to the Provider listed on page 1, q. 17-19.

33. HBsAg: ☐**Positive;** ☐**Negative** Test Date: (Mo/Day/Yr.) _____/_____/_____ ☐ **Not Done**

34. anti-HCV: ☐**Positive;** ☐**Negative** Test Date: (Mo/Day/Yr.) _____/_____/_____ ☐ **Not Done**

35. HIV: ☐**Positive;** ☐**Negative;** ☐**Indeterminant** Test Date: (Mo/Day/Yr.) _____/_____/_____ ☐**Not Done**

36. Other: Name of Test:_____ Test result: _____ Test Date: (Mo./Day/Yr.) _____/_____/_____

Note: Source results may be released to the source patient; the exposed person; the exposed person's physician/provider or OSDH per OAC 310:555.

37. Date results released to Provider: (Mo/Day/Yr) _____/_____/_____ 38. Date mailed to OSDH: (Mo./Day/Yr.) _____/_____/_____

When Part II is completed, mail immediately to the OSDH HIV/STD Service using the gray, self-addressed, metered envelope.

Part III: OSDH Section (*Please Print*)

Date Report Received: (Mo./Day/Yr.) _____/_____/_____ Person Completing Part III: _____
(Last) (First)

OSDH Division:_____

Follow-Up Action: _____

_____

_____

_____

_____

_____

_____

Communicable Disease Risk Exposure Report

The filing of this report initiates a system of notification for risk exposures occurring outside of a health care facility to health care workers, emergency responders, and funeral workers as specified by the Oklahoma State Department of Health OAC 310:555. This report and all information entered on it are to be held in strictest confidence in conformance with 63 O.S. Supp. 2001, Section 1-502.1 et. seq.

PART I: Exposed Worker Section ***(Please Print)***

1. Employee Name: _____ 2. Birth date: _____/_____/_____
(Last) (First) (MI) Mo. Day Yr.

3. Home Telephone: (_____)_____ 4. Profession/Job Title:_____

5. Employer/Company Name:_____

6. Work Address/Telephone: _____ (_____)_____
(Street) (City) (Zip) Telephone

7. Number of hepatitis B vaccinations previously received: ☐ **None;** ☐ **1;** ☐ **2;** ☐ **3**

8. Date of Exposure: (Mo./Day/Yr.) _____/_____/_____ 9. Time of Exposure: _____AM or PM (Circle One)

10. Supervisor's Name/Telephone: _____ (_____)_____
Telephone

11. Description of Exposure: _____

_____

_____

12. Source Patient Name: _____
(Last) (First) (M.I.)

13. Location of Source Patient (include name of facility, address and phone number): _____

_____

To Be Completed By Employer's Designee

I have reviewed the circumstances and management of this incident and verify that the appropriate follow-up (according to our agency Exposure Control Plan) is being attempted in order to identify or prevent the transmission of communicable diseases to which the employee may be at risk as a result of this exposure.

14._____ 15. _____ 16. _____/_____/_____
Name & Title (Print) Signature Mo. Day Yr.

Post-exposure counseling and follow-up will be provided to this employee by:

17. _____ 18. (____)_____ 19. (____)_____
Provider's Name Provider's Telephone Number Provider's Fax Number

---

To Be Completed by A Licensed Health Care Professional (MD, DO, RN, PA,)

In my professional judgment, this ☐ **was** ☐ **was not** a mucosal, percutaneous or respiratory exposure that has the potential for transmission of a communicable disease, such as hepatitis B, hepatitis C, HIV, TB or meningococcus.

20. _____21. _____22. _____/_____/_____
Name & Title (Print) Signature Mo. Day Yr.

For consultation regarding exposures and PEP meds: PEP Hotline 1-888-448-4911

Note: If this exposure does not warrant medical follow-up, please return the form to the *Employer's Designee* and indicate to that individual why no follow-up is required.

If this is an exposure that warrants medical follow-up, the ***employer*** **shall handle the report accordingly:**

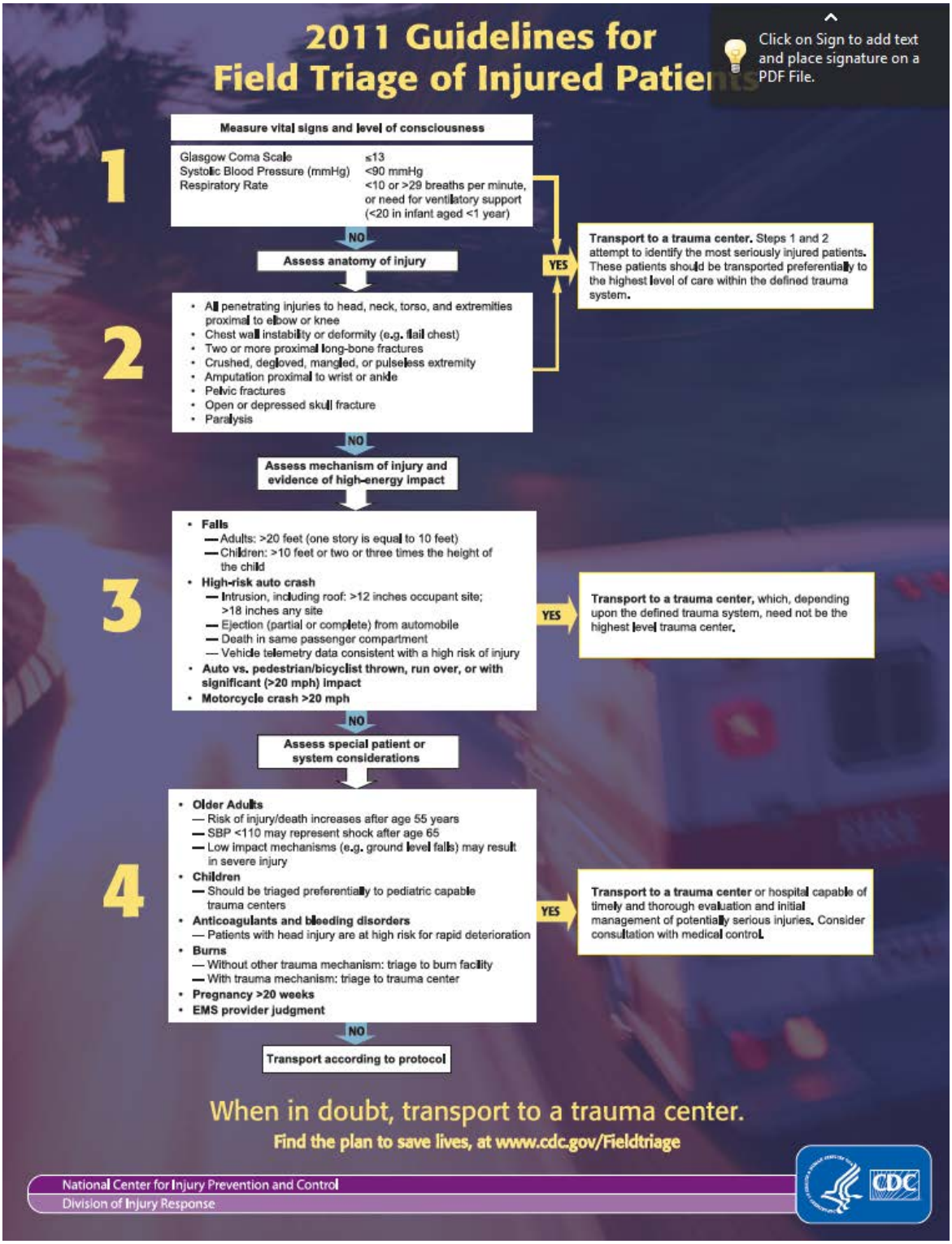
A. ***Yellow*** copy to be mailed ***Immediately*** **to the OSDH HIV/STD Service (use gray, self-addressed, metered envelope) at 1000 N.E. 10, OKC, Ok 73110**

B. ***Green*** copy, a gray metered envelope and instruction page to be delivered ***immediately*** to the designated person (usually the Infection Control Practitioner) at the location of the source patient.

Oklahoma State Department of Health

EMERGENCY MEDICINE
UNIVERSITY OF OKLAHOMA
EMS DIVISION

19D – CDC FIELD TRIAGE DECISION SCHEME



ADULT PRE-HOSPITAL

TRIAGE AND TRANSPORT GUIDELINES

Oklahoma Model Trauma Triage Algorithm

- Inability To Secure Airway
- Traumatic Arrest

YES → Go Directly to Nearest Appropriate Facility

PRIORITY 1

Physiological Compromise Criteria

- Hemodynamic Compromise1-Systolic BP < 90mmHg
  Or signs that should be considered include:
  - Sustained tachycardia
  - Cool diaphoretic skin
- Respiratory Compromise2- RR < 10 or > 29 breaths/minute or < 20 in infant < 1 yr
- Altered Mentation of trauma etiology3- GCS < 14

YES →

Initiate Trauma Treatment Protocol
Activate Trauma System

RAPID transport to the designated Level I, II, or Regional Level III Trauma Center according to the Regional Trauma Plan but may be stabilized at a Level III or IV facility depending on location and time and distance to the higher level trauma center.

Air Rendezvous may be necessary considering time & distance constraints. If conditions do not permit air transport then consider ALS rendezvous. Stabilization may occur either in the field or at the nearest appropriate facility.

Combination of burns > 10% or significant burns involving face, airway, hands, feet or genitalia without significant trauma transport to regional Burn Center. Burns >10% with significant trauma transport to trauma center.

NO ↓

Anatomical Injury

- Penetrating injury of head, neck, chest/abdomen, or extremities proximal to elbow or knee
- Combination of burns > 10% or significant burns involving face, airway, hands, feet or genitalia without significant trauma transport to regional Burn Center. Burns >10% with significant trauma transport to trauma center.
- Amputation above wrist or ankle
- Paralysis or suspected spinal fracture w/neurological deficit
- Flail chest
- Two or more obvious proximal long bone fractures [upper arm or thigh]
- Open or suspected depressed skull fracture
- Unstable pelvis or suspected unstable pelvic fracture
- Tender and/or distended abdomen
- Crushed, degloved, or mangled extremity

YES →

NO ↓

PRIORITY 2

Risk of Serious Injury - Single System Injury

Patients with potentially time sensitive injuries due to a high energy event (positive mechanism of injury) or with a less severe single system injury, but currently with no physiological abnormalities or significant anatomical injury

- Ejection of the patient from an enclosed vehicle
- Auto/pedestrian or auto/bike or motorcycle crash with significant impact (> 20 mph) with the patient thrown or run over by a vehicle
- Falls greater than 20 feet or distance 2-3 times height of patient
- Significant assault or altercations
- High risk auto crash5
- **Neurology**: Isolated head trauma with transient loss of consciousness or altered mental status but currently alert and oriented.
- **Orthopedic**: Single proximal and distal extremity fractures (including open) from high energy event, isolated joint dislocations-knee, hip, elbow, shoulder without neurovascular deficits, and unstable joint (ligament) injuries without neurovascular deficits.
- **Maxillofacial trauma**: Facial lacerations; such as those requiring surgical repair, isolated open facial fractures or isolated orbit trauma with or without entrapments, or avulsed teeth.

YES →

Initiate Trauma Treatment Protocol

PROMPT transport to the designated Level III Trauma Center or higher depending on location according to the Regional Trauma Plan

NO ↓

PRIORITY 3

- Consider[6]
  - Co-morbid factors
  - Gestalt-EMS clinical judgment

YES → (Initiate Trauma Treatment Protocol)

NO →

TRANSPORT to either the closest Level IV Trauma Center or higher depending on location according to the Regional Trauma Plan or the facility of the patient's choice

PEDIATRIC (≤ 16YEARS) PRE-HOSPITAL

TRIAGE AND TRANSPORT GUIDELINES

Oklahoma Model Trauma Triage Algorithm

- Inability To Secure Airway
- Traumatic Arrest

YES → Go Directly to Nearest Appropriate Facility

PRIORITY 1

Physiological Compromise Criteria

- Hemodynamic Compromise[1]-Systolic BP < 90mmHg or other signs such as:
  - Sustained tachycardia
  - Cool diaphoretic skin
- Respiratory Compromise[2]- RR < 10 or > 29 breaths/minute or < 20 in infant < 1 yr

Altered Mentation of trauma etiology[3]- GCS < 14

YES →

NO ↓

Anatomical Injury

- Penetrating injury of head, neck, chest/abdomen or extremities proximal to elbow or knee
- Combination of burns > 10% or significant burns involving face, airway, hands, feet or genitalia without significant trauma transport to Hillcrest Burn Center or OUMC Children's Hospital. Burns >10% with significant trauma transport to trauma center.
- Amputation above wrist or ankle
- Paralysis or suspected spinal fracture w/neurological deficit
- Flail chest
- Two or more obvious proximal long bone fractures (upper arm or thigh).
- Open or suspected depressed skull fracture
- Unstable pelvis or suspected unstable pelvis fracture
- Tender and/or distended abdomen
- Crushed, degloved, or mangled extremity

Pediatric Trauma Score ≤5

YES →

Initiate Trauma Treatment Protocol Activate Trauma System

RAPID transport to the designated Level I, II, or Regional Level III Trauma Center according to the Regional Trauma Plan but may be stabilized at a Level III or IV facility depending on location and time and distance to the higher level trauma center.

Air Rendezvous may be necessary considering time & distance constraints. If conditions do not permit air transport consider ALS rendezvous. Stabilization may occur either in the field or at the nearest appropriate facility.

Combination of burns > 10% or significant burns involving face, airway, hands, feet or genitalia without significant trauma transport to Hillcrest Burn Center or OUMC Children's Hospital. Burns >10% with significant trauma transport to trauma center.

NO ↓

PRIORITY 2

Risk of Serious Injury - Single System Injury

Patients with potentially time sensitive injuries due to a high energy event (positive mechanism of injury) or with a less severe single system injury, but currently with no physiological abnormalities or significant anatomical injury

- Ejection of the patient from an enclosed vehicle
- Auto/pedestrian or auto/bike or motorcycle crash with significant impact (> 20 mph) with the patient thrown or run over by a vehicle
- Falls greater than 10 feet or distance 2-3 times height of patient
- Significant assault or altercations
- High risk auto crash[5]
- **Neurology:** Isolated head trauma with transient loss of consciousness or altered mental status but currently alert and oriented.
- **Orthopedic:** Single proximal and distal extremity fractures (including open) from high energy event, isolated joint dislocations-knee, hip, elbow, shoulder without neurovascular deficits, and unstable joint (ligament) injuries without neurovascular deficits.
- **Maxillofacial trauma:** Facial lacerations; such as those requiring surgical repair, isolated open facial fractures or isolated orbit trauma with or without entrapments, or avulsed teeth.

Pediatric Trauma Score 6-8

YES →

Initiate Trauma Treatment Protocol

PROMPT transport to the designated Level III Trauma Center or higher depending on location according to the Regional Trauma Plan

NO ↓

PRIORITY 3

- Consider[6]
  - Co-morbid factors and Gestalt-EMS clinical judgment

Pediatric Trauma Score 9-12

YES → (Initiate Trauma Treatment Protocol)

NO →

TRANSPORT to either the closest Level IV Trauma Center or higher depending on location according to the Regional Trauma Plan or the facility of the patient's choice

100.3.17 Incident Scene Rehabilitation: (Rehab)

100.3.17.1 General:

No member will be permitted to continue emergency operations beyond safe levels of physical or mental endurance. The intent of rehab is to lessen the risk of injury that may result from extended field operations under adverse conditions. Rehab is implemented during hot or cold environmental temperature extremes, but may be used anytime at the direction of the IC.

100.3.17.2 Work-to-Rest Ratio:

The basic work-to-rest ratios are listed below. These ratios are considered minimum guidelines and can be adjusted for incident conditions.

Work: After:
- One 30-minute SCBA cylinder
- 20 minutes of intense work without SCBA

Rest: 10 minutes of self-rehabilitation (rest with hydration)

Work: After:
- Two 30-minute SCBA cylinders
- One 45/60-minute SCBA cylinder when encapsulating chemical protective clothing is worn
- 40 Minutes of intense work without SCBA

Rest: 20 minutes of rest (with hydration) in a rehabilitation area

100.3.17.3 Ongoing Hydration: (Water)

Minimum of 2-4 oz. of water for every:
- 20 minutes during any type of firefighting
- 20 minutes during major medical or mass casualty incidents
- 15-30 minutes during Hazmat/special operations

100.3.17.4 Long Term Incident Hydration: (Diluted Sports Drink)

When the on-scene time exceeds two hours, members will be provided with sports drink diluted to half strength with water in place of water at the intervals indicated above.

100.3.17.5 Rehab Levels and Functions:

100.3.17.5.1 Self-Rehabilitation (Company/Crew Level Rehabilitation):

Self-rehabilitation occurs after short duration incidents and/or between trips to the Rehab Area. Company officers should ensure that fluids are available on their apparatus so that members can replace fluids (while changing SCBA cylinders, taking short breaks, etc.).

100.3.17.5.2 Formal Rehab (Rehab Group):

The Rehab group will be used to evaluate and assist personnel who could be suffering from the effects of sustained physical or mental exertion during emergency operations.

The rehab group provides a specific area where personnel will assemble to receive:

- A physical assessment
- Rest, hydration, and refreshments
- Medical evaluation and treatment of minor injuries
- Continual monitoring of physical condition
- Transportation for those requiring treatment at medical facilities
- Initial stress support assessment
- Reassignment

100.3.17.5.2.1 Rehab Group Resources and Capabilities:

When the IC implements the Rehab Group, the group supervisor should utilize any of the following resources that he/she deems appropriate:

- EMSA
- TFD Apparatus with Rehab Equipment
  - Air & Light Units
  - Hazmat
  - TFD Bus
- TFD Training Staff: The TFD Training Center maintains a cache of towels, buckets, and sports drink for Rehab. Additionally, the staff can bring the TFD Bus.
- TFD EMS Staff
- TFD ALS Capabilities
- TFD Fitness Staff
- MTTA Bus
- Any other resource necessary

The IC has the discretion to assign an appropriate person to the position of Rehab Group Supervisor. When assigning this position, the IC should consider the following personnel:

- TFD EMS Officer
- TFD Training Officer
- TFD Exercise Physiologist
- TFD Chief Officer or Company Officer
- EMSA Supervisor

100.3.17.5.2.2 Check-In Point:

This is the initial entry point. Rehab staff will take a pulse rate on all crew members.

- Any member who has a pulse rate greater than 120 will report directly to medical rehab. These members will be treated by advanced life support personnel in accordance with EMS protocols.
- All other members will report to the hydration and replenishment area.

100.3.17.5.2.3 Hydration and Replenishment Area:

During warm weather conditions, all personnel will remove coats, helmets, gloves, and protective hoods. Turnout pants should be removed or at least rolled down over the boots. Fluid and electrolyte replacement will be provided.

The following requirements pertain to the physical area used for Rehab:

- A key concept to abide by when establishing a Rehab Area is to set it up as close as safely possible to where firefighters are working.
- During hot temperature extremes, avoid placing personnel directly in an air conditioned environment. Provide a shaded area with air movement. Air and Light Units and Hazmat have canopies, fans and misters for this purpose. Hazmat also has tent capabilities. Rehab supervisors may also be able to secure areas that are close to the incident.

The following other requirements pertain to personnel assigned to the hydration and replenishment area:

- All personnel should spend a minimum of 20 minutes resting in this area.
- Personnel should consume a minimum of 10 ounces of water or other approved beverages while in this area.
- Personnel should place their arms into cool (not cold) water as they are resting (See *Rehab Group Resources*).
- Smoking is not permitted in this area.

100.3.17.5.2.4 Medical Rehab and Transport Area:

This Section is staffed by an ALS crew and at least one EMS transport vehicle. Personnel reporting here will receive evaluation and treatment per EMS protocols. The ALS crew in this area will pay close attention to the following:

- Pulse
- Pulse-ox
- Respiratory rate
- Blood pressure
- Body temperature
- Obvious injuries or illness

Any firefighters who receive IV fluids are considered to be in medical rehab and fall under EMS protocols. Additionally, those receiving IV fluids will be taken to the appropriate medical facility to obtain laboratory blood testing to ensure appropriate levels of hydration, electrolytes, and renal function.

100.3.17.5.2.5 Reassignment Area:

After the prescribed rehabilitation (minimum of 20 minutes for an initial cool down and evaluation period) members will be re-evaluated. Upon evaluation, the members will be triaged into one of the following groups:

- Return to duty - adequately rehabbed and medically sound.
- Remove from duty - evidence of an illness or injury; including any person with a pulse rate greater than 100.
- Transported to an appropriate medical facility for further evaluation and treatment of illness or injury; including any member who has a temperature greater than 101 °F (38 °C) or a blood pressure less than 100 (systolic).

Members who are transported to a medical facility should be accompanied by a department representative.

Crews authorized to return to duty will be released as intact crews and report to the Reassignment Area.

The rehab group supervisor will update the IC throughout the operation with pertinent information including the identities of companies in Rehab, the companies available for reassignment, and the status of injured personnel.

Company officers must keep crews intact and report to the proper sections in Rehab. The rehab group supervisor will direct the crew to the proper areas; however, it is the company officer's responsibility to make sure crew members receive refreshments, rest, and a medical clearance.

100.3.18 Incident Public Information: A Guide for Incident Public Information Officers (PIOs).

100.3.18.1 General:

Public Information is a part of the emergency management process. The IC is responsible for the professional delivery of information to media personnel at the scene.

You are the TFD's Representative. If you choose to not speak on the department's behalf, the media will find someone outside the department who will.

Freedom of Information Act: Media personnel have the right to be there. Restricting media access for reasons other than their personal safety is not beneficial and is damaging to a positive and professional working relationship. On large-scale incidents, establish a "media staging area".

100.3.18.2 Basic Communication Skills:

100.3.18.2.1 Verbal Communication:

- Grammar: Avoid "slang" terms and use proper pronunciation.
- Inflection: Speak in a calm, even tone.
- Make your comments relevant and clear. Speak in "sound bytes." Speaking in "sound bytes" means to make complete statements that cannot be misinterpreted if the media shows a small part of your interview (a sound byte).
- Make comments appropriate to the situation at hand.

REHABILITATION
ARM & HAND IMMERSION IN TAP WATER

A simple, safe and controlled method to reduce heat stress is hand and arm immersion into containers of standard tap water. Buckets for this procedure will be stored on Engines and specialized apparatus or staff positions.

STEP 1

Remove the helmet, bunker coat, hood, pants and boots when checked into Rehabilitation. The helmet, coat and hood tend to be naturally removed. Direction usually needs to be given to remove the pants and boots. The removal of all gear is essential to obtain the desired cooling.

Fill two buckets with tap water obtained from a garden hose, hose line from fire apparatus or connection to a fire hydrant. **NOTE:** If water is acquired through a fire pump, make certain that it has not been heated from the churn action of the fire pump.

D0 NOT ADD ICE TO THE BUCKETS.

STEP 2

Seat the person onto a bench type surface such as the tailboard of the apparatus or curb of the street. Position the buckets on either side of the person at the same elevation at the object used as a seat. Instruct the person to place both hands and arms into the water with the hands touching the bottom of the bucket. Ideally, the person should spread his/her fingers apart to maximize the exchange of heat.

STEP 3

The immersion process should be conducted for ten to twenty minutes. A similar process may be conducted with the feet for additional control of severe cases.

Continuously monitor the medical condition of the person and frequently record vital signs. Provide medical care as needed.

Also provide cool water or partial strength sports drinks. Do not provide hot or cold beverages and avoid all fluids that contain caffeine.