



METROCREST MEDICAL SERVICES

PATIENT CARE PROTOCOLS FOR THERAPY

for:
EMT, EMT-I,
and
PARAMEDIC
providers with

Aubrey Area Ambulance

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A handwritten signature in blue ink, appearing to read 'Suresh Chavda', is written over a horizontal line.

Suresh Chavda, MD, FACEP
Metrocrest Medical Services Medical Director

EMS personnel under my Medical Direction may use these Patient Care Protocols in their primary 911 area, mutual aid response area, and while on transfers. These Protocols may be used under my Medical Direction by Metrocrest Medical Services authorized EMS personnel only when officially representing an EMS agency under the Medical Direction of Metrocrest Medical Services.

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METROCREST MEDICAL SERVICES

PROTOCOLS FOR THERAPY:

INTRODUCTORY

AND

GENERAL

INFORMATION

DEFINITION OF TERMS

AC: Antecubital fossa.

Acute Stroke: CVA with onset < 12 hours ago (when patient was last at normal baseline)

Adult Critical Trauma: A patient **13 years of age or older** involved in an injury-producing or potentially injury-producing incident with one of the following:

- Systolic BP of less than 90 mm Hg *WITH* evidence of hypoperfusion (tachycardia, pallor, diaphoresis, altered mentation, prolonged capillary, etc.).
- Evidence of compensated hypotension, such as normal systolic with tachycardia or other signs of hypoperfusion (see above).
- Penetration injury to the head, neck, or chest.
- Significant, persistent dyspnea and/or respiratory rate <10 or >29
- Persistent altered mentation or GCS <14
- Motor vehicle accident resulting in:
 - Death of another occupant in vehicle
 - Ejection of patient
 - Passenger compartment intrusion >12 inches
- Fall greater than 20 feet.
- Following fractures:
 - Two or more proximal long bones (humerus or femur)
 - Flail chest
 - Pelvic fracture
 - Open or depressed skull fracture
- Paralysis

Adult Neurosurgery: Any patient **13 years of age or older with evidence of increasing ICP**, including but not limited to:

- Persistent altered mentation
- Persistent hypertension with normal heart rate or bradycardia
- Severe n/v
- Seizures
- History of previous neurosurgical procedures or problems.

Advanced Life Support: Therapies and procedures beyond basic life support, including: IV's, IO, intubation of the trachea or esophagus, ECG monitoring, defibrillation/cardioversion, surgical airway, chest decompression, external cardiac pacing, endotracheal suctioning. In terms of unit/service authorization by MMS, "Advanced Life Support" authorization indicates that the unit may, if staffed and equipped as per MMS policy and TDSHS rules, provide care at the EMT-Intermediate level.

APAP: Acetaminophen.

Basic Life Support: Therapies and procedures including: vital signs, oxygen administration, airway maintenance, oral/nasal suctioning, bleeding control, bandaging, fracture care and splinting, spinal immobilization, patient assessment, CPR. In terms of unit/service authorization by MMS, "Basic Life Support" authorization indicates that the unit may, if staffed and equipped as per MMS policy and TDSHS rules, provide care at the ECA or EMT level.

BP: Blood pressure

Blood Glucose Determination: Measurement of glucose in the blood as determined by Dextro-Stick, Chemstrip, Glucometer or other device. Expressed in mg/dl.

BG: Blood glucose

BSA: Body Surface Area

BOWR/BOWI: bag of water (amniotic sac) **R**uptured or **I**ntact

CABC's: Immobilization and protection of the spinal column/cord including manual techniques, cervical collars, extrication techniques and devices, backboards, cervical immobilization devices, and strapping.

- Establishment and maintenance of an open and patent airway, including the use of oral/nasal airways, suctioning, and endotracheal intubation.
- Establishment and maintenance of adequate respiratory rate and volume including the use of artificial ventilation, ventilatory assistance, bag-valve mask device.
- Assessment of perfusion and hemorrhage, and circulatory support through external chest compression and control of major external bleeding.

cc: Cubic centimeters (volume)

CPR: Cardiopulmonary Resuscitation as defined by the Emergency Cardiac Care Committee of the American Heart Association.

CRT: Capillary refill time.

Critical Burns: Any patient with one or more of the following:

- Partial thickness burns > 10% BSA
- Burns that involve the face, hands, feet, genitalia, perineum, or major joints
- Third degree burns in any age group
- Electrical burns, including lightning injury
- Chemical injury
- Inhalation injury
- Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality
- Any patient with burns and concomitant trauma (such as fractures)

C-Spine: Immobilization and protection of the spinal column/cord including manual techniques, cervical collars, extrication techniques and devices, backboards, cervical immobilization devices, and strapping.

DM: Diabetes Mellitus.

DNR: Do Not Resuscitate.

DOS: Dead On Scene.

ECG: Electrocardiogram.

EMS Denial: EMS personnel's refusal to offer or provide EMS transport to a patient.

ETCO₂: End Tidal Carbon Dioxide detector, either integral to the BVM or in line between the valve and the mask.

G: Grams.

GCS: Glasgow Coma Scale.

High-Risk Obstetrics: Obstetrical patient with any of the following:

- Labor prior to 32 weeks gestation.
- Prolapsed cord.
- Limb presentation.

IN: Intranasal administration of medication.

IM: Intramuscular administration of medication.

Infant: Patient aged less than 1 year.

IO: Intraosseous access, fluid administration, or fluid/medication administration route.

IV: Intravenous access, fluid administration, or fluid/medication administration route.

IVP: IV push administration of medication.

Kg: Kilograms.

mcg: micrograms

Medical Control Physician: *On line:* The on-duty, attending Emergency Department physician at any MMS medical control site authorized by the Metrocrest Medical Services Medical Director to provide Medical Control to MMS EMS personnel. *Off line:* The Metrocrest Medical Services Medical Director who provides medical control directly through written protocols, policies, and procedures and indirectly through the on line MC physicians.

Medical Control: Orders or consultation provided by a physician to EMS personnel authorizing or instructing medical care. *On line:* direct communication with an authorized MC physician. *Off line:* medical direction provided through written protocols, policies, and procedures.

MC: Medical control, also, **OLMC:** On-Line Medical Control.

MCI: Multi-casualty incident. Any single incident which overwhelms the immediately available EMS resources, in terms of assessment, treatment, or transport, to such an extent that not all patient needs can be continuously met.

mg: Milligrams.

min. or mins.: Minutes

MMS: Metrocrest Medical Services, Inc.

Mobile Intensive Care Unit (MICU): A vehicle stocked, equipped, and staffed as per TDSHS rules and MMS policy. MMS authorization to operate as an MICU is authorization to provide care at the level of EMT-Paramedic.

Neonate: Patient aged less than 1 month (or weight less than 5 kg for medication purposes).

n.p.o.: nothing by mouth

NTG: Nitroglycerin

N/V or n/v: Nausea and/or vomiting.

O₂: Administration of supplemental oxygen.

OPA: oropharyngeal airway

PCR: Patient Care Record; documentation of patients condition and of care provided.

Pediatric Patient: A patient less than 13 years of age (has not reached 13th birthday)

Pediatric Critical Care Medicine: A patient < 13 years of age with any of the following:

- Evidence of myocardial ischemia, infarct, dysrhythmias, or infection
- History of congenital cardiac defect with cardiac symptoms
- Any status seizure, or any new-onset seizure other than a simple febrile seizure
- Pulmonary edema
- Evidence of sepsis or meningitis
- Respiratory failure
- Shock not secondary to simple dehydration
- Infant delivered prior to 36 weeks gestation.

Pediatric Trauma: A patient < 13 years of age with any of the following:

- Fall of > three times the child's height
- Persistent tachycardia with normo- or hypo-tension with a significant injury mechanism
- Significant injury mechanism with bradycardia
- Persistent dyspnea with a significant injury mechanism
- Penetrating injury to head, neck, chest, or abdomen
- Two or more proximal long bone fractures (humerus or femur)
- PTS of < 8.

Pediatric Neurosurgery: Any patient < 13 years of age **with evidence of increasing ICP**, including but not limited to:

- Persistent altered mentation
- Persistent hypertension with normal heart rate or bradycardia
- Severe n/v or seizures
- Bulging fontanelles in infants.

P&P: Policies and Procedures of MMS or the EMS provider service.

p.o.: by mouth, medications administered orally.

PRN: As needed.

Psychiatric Emergency: Any situation in which the patient's moods, thoughts, or actions are so disordered or disturbed that they have the potential to produce danger, harm, or death to themselves or to others if the situation is not quickly controlled. Includes any patient who verbalizes threats to himself or others or who has made a suicide gesture or attempt. This excludes any patient with a medical (organic) etiology for the disturbance.

PTS: Pediatric Trauma Score.

q: Every.

ROSC: Return of Spontaneous Circulation in a patient who was in cardiac arrest.

SL: Sublingual medication administration.

SpO₂: Blood oxygen saturation.

SQ: Subcutaneous medication administration.

Standing Orders: Advanced life support procedures/therapies which may be performed in accordance with the Protocols without a direct physician's order.

STEMI: Myocardial Infarction with evidence of ST elevation on a 12-lead ECG.

SVT: Supra-Ventricular Tachycardia. A tachycardia (rate > 150) which originates in the AV node, atria, or SA node.

TCA: Tricyclic antidepressant

TDSHS: Texas Department of State Health Services

VF: Ventricular fibrillation.

Vital Signs or V/S: Respiratory rate, blood pressure, and pulse rate.

VT or V-Tach: Ventricular Tachycardia.

STANDARD OF CARE STATEMENT

Clinical competence and high standards are vital functions in providing quality pre-hospital emergency medical care to the customers who rely on our services. The following treatment protocols represent the minimal level of patient care that is to be provided on request for service. The Standard of Care Statement and the aforementioned treatment protocols represent only the minimal standards of care to be provided to patients in our service area.

MMS embraces as fundamental components of its standard of care the following concepts:

- **The emergent patient benefits from early medical interventions**, especially the early and aggressive application of airway establishment and maintenance, early administration of oxygen, early protection of the cervical spine, and early initiation of definitive therapies.
- **The patient defines the emergency** . As EMS personnel we are often called upon to assist with social or psychological problems and we must respond as professionally and thoroughly to these as we do for medical or surgical problems. Be an advocate for the patient and treat them as you would want your family members treated.
- **Our role as EMS personnel is to truly act as the eyes, ears, and hands of the physician**. To successfully do so requires that we educate ourselves beyond first aid procedures and dedicate ourselves to being an integral part of the total health care team.
- **EMS personnel are not confined to just knowing their responsibilities**. They should expand their knowledge to assist Medical Control with overall patient care. Personnel should seek knowledge and methods to improve the patient care they provide.

GUIDE FOR USING THE MMS PROTOCOLS

This protocol manual is divided into categories of general protocols, adult and pediatric emergencies, procedures, and references. Each protocol defines the initial procedures EMS personnel will use in treating the defined situation as well as recommendations for continued treatment per Medical Control approval.

The medical treatment protocols are indexed by body system. The protocols for each body system will cover both medical and trauma conditions for adult and pediatric patients. These are diagnostic-based protocols. This means the medic should arrive at a working differential for what is wrong with the patient and select the protocol that best matches that primary differential

Personnel who have not completed an orientation to the MMS Medical Control System are considered “Limited.” Refer to Metrocrest Policy 2009-018 regarding Medical Control Authorization and to [AUTHORIZED INTERVENTIONS AND PROCEDURES LISTED BY MMS MEDICAL CONTROL AUTHORIZATION LEVEL](#) in this document for the scope of practice for each certification level and limitations placed on “Limited Authorization” personnel.

Upon completion of the MMS Medical Control System orientation and “Full” authorization in the Medical Control System, personnel may utilize all of the therapies and procedures for their certification level as standing orders. All interventions indicated below the "**MEDICAL CONTROL**" line require on-line physician orders as per the MMS Medical Control procedure policy. EMT and EMT-I level personnel may contact Medical Control for orders but may not request to perform therapies that are not in their scope of practice. Once MMS MCS authorization is issued, the EMS personnel must adhere to the standards defined in these protocols, the patient care policies, and the Quality Improvement program or face revocation of medical control authorization if those standards are violated.

EMS personnel will contact Medical Control in those cases of patient contact as defined in the MMS Medical Control procedure policy for direction in the management of the patient or situation. In some instances, the Medical Control physician may elect to direct treatment or intervention which varies from the suggested guidelines. In that case, the EMS personnel are to follow the direction of the Medical Control physician. ***EMS personnel may, and are encouraged to, contact Medical Control at anytime for consultation or to relay further patient information.***

EMS personnel may encounter situations where a therapy they believe is indicated is not covered in the protocols. Before deviating from or providing any therapy that is not specifically listed in the protocols, EMS personnel must receive specific approval for such therapy from the On-Line Medical Control Physician.

New protocols should supersede the old standards; old protocols should be destroyed as they are replaced. The effective dates will be listed on the cover sheet of the protocols.

The EMS personnel will be responsible for the knowledge of patient care and medical intervention of each and every protocol in their entirety.

Supporting information for the protocols can be found in the NOTES after each protocol.

AUTHORIZED INTERVENTIONS AND PROCEDURES

LISTED BY MMS MEDICAL CONTROL AUTHORIZATION LEVEL

The following represents the patient care therapies which are authorized to be performed by MMS EMS personnel for each certification level as stated in the "Protocols" section of this document.

Personnel who have completed an orientation to the MMS Medical Control System (NETTC) are authorized to perform the below listed therapies for their respective certification level. New personnel who have not completed NETTC are considered "Limited." These personnel *may not* perform interventions indicated with an asterisk (*). Refer to Metrocrest Policy 2009-018 regarding obtaining Medical Control Authorization. It is the responsibility of the EMS agency to ensure their new personnel who have not completed NETTC are familiar with the restrictions placed on their practice.

Those interventions indicated with (***) require additional, specialized training and individual authorization by MMS to perform the procedure.

Emergency Medical Technician

- Oxygen administration
- Use of airway adjuncts, including:
 - oral and nasal airways
 - bag-valve mask device
 - oral suctioning
- Provision of CPR, as defined by the American Heart Association
- Vital signs
- Bandaging and splinting, including traction splinting
- Cervical spine immobilization
- Patient assessment
- Manual techniques for:
 - airway provision and maintenance and ventilatory support
 - relief of airway obstruction, as prescribed by AHA
 - control of external hemorrhage
- Use of AED
- Blood glucose determination*
- Aspirin administration*
- Epinephrine Administration*
- Esophageal airway*
- Nebulized bronchodilation*
- Nitroglycerin administration*
- Oral administration of glucose*

Emergency Medical Technician-Intermediate

- Oxygen administration
- Use of airway adjuncts, including:
 - oral and nasal airways
 - bag-valve mask device
 - oral suctioning
- Provision of CPR, as defined by the American Heart Association
- Vital signs
- Bandaging and splinting, including traction splinting
- Cervical spine immobilization
- Patient assessment
- Manual techniques for:
 - airway provision and maintenance and ventilatory support
 - relief of airway obstruction, as prescribed by AHA
 - control of external hemorrhage
- Use of AED
- Blood glucose determination
- Aspirin administration
- Epinephrine Administration
- Esophageal airway
- Nebulized bronchodilation*
- Nitroglycerin administration*
- Oral administration of glucose
- IV access
- External jugular IV*
- IV fluid administration
- Administration of 50% dextrose
- Administration of IM/IV thiamine*
- Administration of IM/IV/IN naloxone*
- Orotracheal intubation
- Administration of CPAP*
- Administration of PEEP*
- Nasotracheal intubation*
- Surgical airway*
- Needle chest decompression*
- Intraosseous infusion*

Emergency Medical Technician-Paramedic

- Oxygen administration
- Use of airway adjuncts, including:
 - oral and nasal airways
 - bag-valve mask device
 - oral suctioning
- Provision of CPR, as defined by the American Heart Association
- Vital signs
- Bandaging and splinting, including traction splinting
- Cervical spine immobilization
- Patient assessment
- Manual techniques for:
 - airway provision and maintenance and ventilatory support
 - relief of airway obstruction, as prescribed by AHA
 - control of external hemorrhage
- Use of AED
- Blood glucose determination
- Aspirin administration
- Epinephrine Administration
- Esophageal airway
- Nebulized bronchodilation
- Nitroglycerin administration
- Oral administration of glucose
- IV access
- External jugular IV*
- IV fluid administration
- Orotracheal intubation
- Administration of CPAP*
- Administration of PEEP*
- Nasotracheal intubation*
- Surgical airway*
- Needle chest decompression*
- Intraosseous infusion*
- Obtaining and interpreting ECG including 12 lead ECG
- Defibrillation and cardioversion
- External cardiac pacing
- Vagal maneuvers
- Administration of IV, IM, IN, SQ, PO, and SL medications
- Nasogastric intubation/lavage*

CABC'S

THE STARTING SURVEY

Throughout these protocols, the acronym "CABC's" is used to indicate the primary survey of every patient, but particularly the emergent patient. Our primary survey consists of the evaluation and, if needed, management of the following components:

- Cervical spine
- Level of consciousness
- Airway
- Breathing
- Circulation.

The following is an outline for the assessment and management of these components.

Cervical Spine

If there is *any* possibility of a spinal injury, the provider must assume that one exists and approach the patient accordingly. Once permission to assess the patient is obtained, by actual or implied consent, the provider's *next* step on any patient with the possibility of spinal injury is to manually obtain control of the c-spine. This manual c-spine stabilization must be maintained until 1) further assessment clearly and absolutely rules out any possibility of spinal injury, 2) the spine is adequately immobilized with adjuncts which relieve the need for manual stabilization, or 3) the patient refuses further treatment or transport.

Level of Consciousness

The level of consciousness should be briefly assessed next, to determine only the patient's rating on the "AVPU" scale (alert, responsive to voice, responsive to pain, unresponsive). Further assessment of the level of consciousness is to be deferred until the secondary survey.

Airway

The patient's airway must next be evaluated for patency. If there is any indication of a compromise in the patient's airway or any threat that such a compromise will develop, the provider must immediately intervene to secure the airway. Indications of compromise may be as overt as apnea or a visible obstruction, or may be indicated by a less obvious sign such as airway noises (stridor, snoring, gurgling, etc).

The airway should be secured first with positioning, using a jaw-thrust if spinal injury cannot be ruled out or a head-tilt/chin-lift if spinal injury is not a concern. If material must be physically removed from the airway, this should be done next using abdominal or chest thrusts, a finger sweep, and/or oral suctioning as appropriate. If the patient's level of consciousness is diminished, an airway adjunct should be placed next. Use an oral airway if the patient will tolerate it, otherwise use a nasal trumpet. Manual positioning **must** be maintained concurrently with the use of such an adjunct. If possible, the airway should next be definitively secured with ET intubation (or esophageal airway).

Even in the patient whose airway is initially patent, the provider must continuously re-assess and be prepared to intervene against any airway compromise.

Breathing

The next component to be assessed is the patient's respiratory status. If the patient is not breathing spontaneously, ventilation with supplemental oxygen must be initiated immediately. If the patient is breathing spontaneously, the adequacy of the patient's respiratory effort must be evaluated. If the patient's rate or tidal volume is inadequate, assisted ventilation with supplemental oxygen is to be provided immediately. The patient's chest should also be rapidly assessed for any injury which would compromise respiration. If any open chest wound is found, it must be immediately occluded, initially with the provider's gloved hand and then with an occlusive dressing.

The bag-valve-mask device with oxygen at 10-15 l/min and a reservoir bag is the preferred method of providing ventilation. The airway should be secured with an advanced airway if ongoing positive pressure ventilation is necessary.

As with the airway, the provider must continuously reassess the ventilatory status of even the most stable patient and be prepared to rapidly intervene if respiratory compromise develops.

Circulation

The patient shall next be assessed for 1) adequate circulation and 2) for the presence of major external hemorrhage. If the patient is awake or at least responsive to verbal or physical stimulus, the provider shall assume that circulation is adequate for the moment and move on. If the patient is unresponsive, the provider will assess for the presence and adequacy of a palpable carotid pulse. If the patient does not have a palpable carotid pulse, or has a pulse of less than 60/min in an infant or child, the provider must immediately initiate chest compressions. A more accurate evaluation of the patient's perfusion status will be done during the secondary survey. Next, rapidly assess the patient for external bleeding. If major bleeding is found, it should be immediately controlled with direct pressure.

In summary, the primary survey includes (in order):

- 1. Obtain manual control of cervical spine.**
- 2. Quickly establish level of consciousness (AVPU).**
- 3. Evaluate airway. Establish patent airway if needed.**
- 4. Evaluate breathing. Initiate ventilation or ventilatory assistance if needed.**
- 5. Assess for open chest wounds. Occlude any found.**
- 6. Check for presence and adequacy of circulation. Initiate chest compressions if needed.**
- 7. Check for external bleeding. Control any significant bleeding found.**

Non-traumatic Cardiac Arrests

If encountering a patient in non-traumatic cardiac arrest, the sequence should be altered as per the recommendation of the American Heart Association: "C-A-B." External chest compressions should be the initial priority, and can begin with no additional equipment needed. Establishing an airway and ventilating the patient may begin as soon as the equipment to provide such is at the patient's side.

DIAGNOSTIC TOOLS AND PROCEDURES

Diagnostic tools and procedures are defined as vital signs, blood glucose determination, temperature, ECG evaluation, and pulse oximetry.

VITAL SIGNS

Complete vital signs are defined as respiratory rate, pulse or heart rate (indicate which), capillary refill (in the pediatric patient less than one year of age) and blood pressure (auscultated if possible with both systolic and diastolic).

Capillary refill time (CRT) may be used as an *adjunct* to blood pressure in assessing/describing the perfusion status of any patient. CRT is not an acceptable substitute for BP in the patient greater than 1 year of age.

A systolic BP alone (palpated BP) is acceptable **ONLY**:

- As an additional vital sign in the non-urgent patient in whom an auscultated BP has already been obtained and was within normal limits.
- In the critical trauma patient in whom serial palpated BP's are being obtained.
- In the patient in whom an auscultated BP **ABSOLUTELY** can not be obtained.

An initial complete set of vital signs is to be obtained within 5 minutes of patient contact. Patients refusing treatment/transport must have one complete set of v/s taken and charted, if the patient allows. If the vitals are out of normal limits, at least a second set should be obtained, a minimum of 5 minutes after the first. All subsequent repeat v/s should be at least 5 minutes apart.

Patients transported to a hospital (except as outlined below) must have a minimum of two complete sets of vital signs obtained and recorded. "Stable" patients with non life- or limb-threatening problems should have vitals repeated every 15 minutes. Urgent or critical patients must have vitals taken every 5 to 10 minutes.

Respiratory rate, blood pressure, and pulse rate are to be obtained on all patients assessed, **INCLUDING** children and infants. **DO NOT** defer BP in pediatric patients unless absolutely unobtainable. Capillary refill and peripheral pulse quality may be substituted for blood pressure measurement in the infant less than 1 year of age.

The accuracy of an obtained blood pressure is influenced by many factors, one of which is the size of the cuff used. It is important that the size of the cuff be correct for the patient. A cuff that is too small for the arm will yield a falsely elevated blood pressure, while one too large will result in a falsely low reading. The cuff should easily go around the patient's upper arm, but the air bladder should not overlap itself. The cuff itself should be 2/3 the length of the patient's upper arm.

It is imperative to note the difference between a heart rate and a pulse rate. The term "heart rate" refers most correctly to the rate of electrical depolarization (usually ventricular) noted on the ECG monitor. "Pulse rate" refers to the palpable rate of perfusion noted at a pulse point. While in most patients these are identical values, this is not always the case. When reporting the rate on the ECG monitor, use the term "heart rate". When reporting the rate derived by feeling the radial, brachial, or carotid pulse, use the term "pulse rate". When using the ECG monitor or an apical pulse to observe the patient's heart rate, one must be absolutely certain that this rate correlates with the perfusing or palpable pulse rate.

In the *critical* patient in which time is a factor, the EMS personnel may use palpable pulses to estimate and document blood pressure. The acceptable values are as follows:

- Palpable **radial pulse:** systolic pressure of at least **80 mm Hg**
- Palpable **brachial pulse:** systolic pressure of at least **70 mm Hg**
- Palpable **femoral pulse:** systolic pressure of at least **60 mm Hg**
- Palpable **carotid pulse:** systolic pressure of at least **50 mm Hg**

BLOOD GLUCOSE

Blood glucose must be assessed on all medical patients with altered mental status. Those patients with altered mental status which appears to be secondary to trauma should also have their blood glucose assessed **IF** such assessment will not delay definitive interventions, such as airway management, cervical spine immobilization, bleeding control, transport, or IV access.

Blood glucose must be assessed on all patients with a history of DM or glucose problems, regardless of complaints or findings.

Blood glucose must be assessed on all newborn infants (1 month of age or less). Blood glucose must be assessed on all patients 1 year or less in distress, regardless of findings or complaints.

Blood glucose must be assessed on all patients who experience a seizure prior to arrival of EMS or while in the care of EMS.

Blood glucose values are reported or documented in terms of milligrams per deciliter (mg/dl).

After administering IV Dextrose, the blood glucose value will remain falsely elevated for quite some time as the cells attempt to uptake the glucose. Therefore, repeat blood glucose determinations may not be useful in determining accurate BG levels. The patient's clinical status should be used to determine whether or not to administer additional dextrose. If a repeat blood glucose determination is used, wait at least 10 minutes after dextrose administration before obtaining one.

TEMPERATURE

Temperature must be assessed on all pediatric seizure patients, all patients suspected of being septic, and all patients whose complaints or findings indicate possible fever.

Temperature also must be obtained on all patients suspected of either hypothermia or heat stroke, and all near drowning patients who present in cardiopulmonary arrest.

If either a tympanic or temporal scan thermometer is available, it is to be utilized for all temperatures. Otherwise, temperature will be taken orally in patients who are capable of holding the thermometer correctly. Temperature will be taken rectally in all other patients.

An oral temperature does not represent true "core" temperature. Therefore, do not use oral temperatures to determine hypothermia. For our purposes, a tympanic, temporal scan, or a rectal temperature may be used to determine temperature in hyperthermic states (heat stroke, febrile seizures, or sepsis), and should be used to guide cooling along with the patient's clinical response. Tympanic or temporal scan thermometers are also to be used in our setting to determine hypothermia, as true core temperature is not available. If a tympanic thermometer or temporal scan thermometer is not available, a rectal temperature is to be used. Axillary temperatures are absolutely not acceptable.

When reporting or documenting a temperature value, indicate the source (oral, rectal, tympanic, or temporal scan).

ECG MONITORING

ECG should be assessed and continuously monitored on ALL patients on whom ALS interventions are performed.

ECG must be assessed on ALL patients complaining of chest pain (or other possible myocardial ischemia pain), shortness of breath, syncope or dizziness, or nausea/vomiting, or who display tachycardia, hypotension, or altered mental status. ECG must also be assessed on all patients who have suffered a convulsion or syncopal episode prior to EMS arrival. ECG must be assessed within 5 minutes of patient contact.

Stable patients presenting in rhythms thought to be either SVT or VT MUST have a 12 lead ECG obtained and recorded. See the [12 lead ECG](#) procedure in the procedure section.

PULSE OXIMETRY

Pulse oximetry should be used to evaluate the oxygen saturation status of all patients in whom hypoxia or ischemia is suspected. This assessment tool provides a measure of the patient's ***oxygenation***.

Pulse oximetry may be used to titrate oxygen delivery, and will permit the EMS personnel to utilize whichever delivery device or flow rate is needed to achieve optimum oxygenation.

Pulse oximetry readings are accurate only if:

- The probe is able to "see" the arterial blood flow
- The patient is reasonably well perfused peripherally
- This means that the probe must be firmly attached to a clean finger or toe. Nail polish may occlude the probe's light beam, so un-polished nails are preferred.
- Additionally, hypotensive, hypoperfused, or peripherally vasoconstricted patients are generally not good candidates for pulse oximetry.
- Bright sunlight can also interfere with the machines ability to read properly

Be sure the pulse oximeter's heart rate matches the patient's palpable pulse rate, that the waveform is peaked sharply or the light is green, and that the light is flashing in concert with the patient's pulse before accepting the SpO₂ value. Pulse oximeter values are reported as % SpO₂ (saturation of oxygen via pulse oximetry). Normal values are 95-100% SpO₂ in the patient without chronic pulmonary or perfusion disorders.

END-TIDAL CO₂

End-tidal CO₂ monitoring, or capnography, provides the rescuer with a measure of the patient's carbon dioxide level in the exhaled air, which is directly related to the CO₂ content in the blood. The values obtained represent the patient's *ventilatory* status. It is measured in mm Hg, and represents a partial pressure exerted in gaseous form. Normal values for ETCO₂ range from 35 to 45 mm Hg. Fundamentally, patients breathing or being ventilated at a rate faster than normal will have readings below the normal range. Conversely, patients with a slower ventilatory rate will have readings above the normal range.

Factors that influence ETCO₂ are:

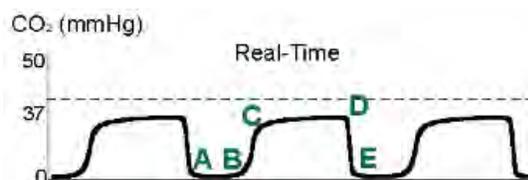
- Metabolism – production of CO₂
- Perfusion – delivery of blood to the tissues and alveoli
- Ventilation – elimination of CO₂

Assessed ETCO₂ values combined with ETCO₂ waveform assessment can help the rescuer detect life-threatening conditions and provide an accurate assessment of the patient's ventilatory status, including but not limited to:

- Esophageal intubation or a dislodged endotracheal tube
- Frank or impending respiratory failure
- Frank or impending circulatory failure
- Sudden increase in ETCO₂ in cardiac arrest patients may signify ROSC. Check for a pulse if this is noted.
- ETCO₂ remaining < 10 mm Hg in cardiac arrest patients predicts 0% survival
- Changes in ETCO₂ values and waveforms in a patient with an obstructive airway disease (COPD, asthma) can help the rescuer determine if bronchodilator therapy is effective, or if the patient requires endotracheal intubation
- ETCO₂ levels and waveform shapes can help the rescuer make a rapid differential diagnosis and identify problems which may lead to hypoxia

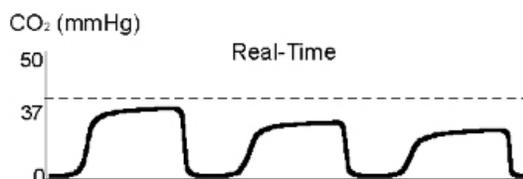
SAMPLE ETCO₂ WAVEFORMS

Normal Tracing:



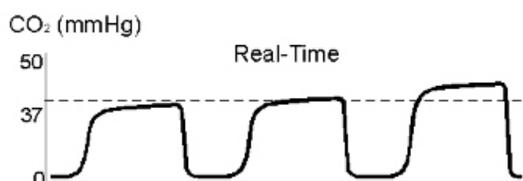
- A to B is baseline
- B to C is expiratory upstroke
- C to D is expiratory plateau
- D is end-tidal CO₂ value
- D to E inspiration begins

Hyperventilation:

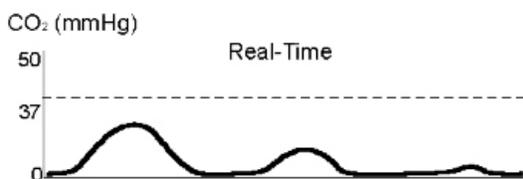


- Increased respiratory rate
- Increased tidal volume
- Decreased metabolic rate
- Fall in body temperature

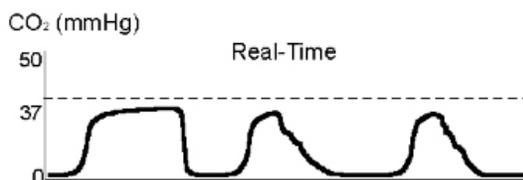
Hypoventilation:



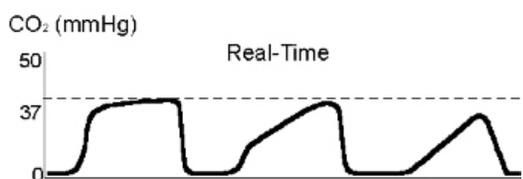
- Decreased respiratory rate
- Decreased tidal volume
- Increased metabolic rate
- Rapid rise in body temperature (hyperthermia)

Esophageal Intubation:

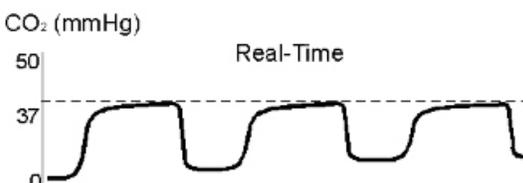
- Missed or dislodged intubation
- Normal ETCO_2 waveform is best evidence of proper placement
- Little or no CO_2 is present if tube is in esophagus

Inadequate Seal:

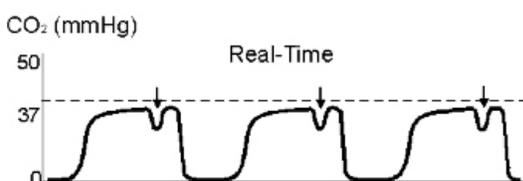
- Leaky or deflated endotracheal tube cuff
- Endotracheal tube is too small for patient

Bronchospasm (prolonged exhalation):

- Partially kinked or occluded endotracheal tube
- Presence of foreign body in airway
- Bronchospasm

Rebreathing (rising baseline):

- Inadequate inspiratory flow
- Insufficient expiratory time
- Faulty expiratory valve

Muscle Relaxants (curare cleft):

- Appear when muscle relaxants (paralytics) begin to subside
- Depth of cleft is inversely proportional to degree of drug activity

End-tidal CO_2 monitoring should be performed on all of the following patients:

- All intubated patients
- All patients in cardiac arrest
- All patients suffering from an inhaled poison or toxin
- Any patient exhibiting signs or symptoms of respiratory distress or difficulty breathing
- Any other patient the paramedic deems necessary

GENERAL THERAPIES

The following procedures, therapies, and medications are authorized above and beyond those noted in the specific protocols for use at the EMS provider's discretion.

Thiamine

Thiamine may be administered to any adult patient in whom the paramedic has any reason to suspect malnutrition or alcohol abuse. Thiamine may be given either 100 mg IV or IM.

Dextrose

Dextrose may be administered to any patient if the EMS personnel suspect hypoglycemia. In the hypoglycemic (or suspected hypoglycemic) patient with an intact gag reflex in whom an IV cannot be established, dextrose may be given orally as a glucose paste solution.

Anti-emetics

Promethazine or Ondansetron may be given to any patient complaining of nausea and/or vomiting who does not have any contraindications to the medication. Both may be given either IM or IV.

IV Starts

Unless specifically limited or prohibited by the particular protocol, advanced EMS personnel may initiate an IV on any patient at their discretion.

Endotracheal Intubation/Esophageal Airway

Advanced EMS personnel may secure the airway of any patient whom they believe is at risk for airway compromise or who requires positive pressure ventilation. The airway may be secured with endotracheal intubation (the preferred method) or esophageal airway, so long as the patient does not have any contraindications to these procedures.

ET Medication Administration

Medications may be given via the endotracheal tube IF:

- 1) IV access is delayed and intubation is accomplished AND
- 2) Auscultation reveals clear lung fields

Medications given via the ET tube are not picked up as well as IV meds, require higher doses and dilution, and are very susceptible to bronchial/alveolar infiltrates and alveolar wall disturbances.

Medications which may be given via ET are: “**L-E-A-N**”

Lidocaine, epinephrine, atropine, naloxone

The unit or "bolus" dose of **any** medication given via ET is to be doubled from the standard IV dose.

Albuterol solution (1 unit dose or 2.5 mg) may be given via the ET tube for asthmatic patients who require intubation.

Acetaminophen

Acetaminophen may be administered to any febrile pediatric patient (without contraindications to the medication) as 15 mg/kg either PO or PR.

VASCULAR ACCESS

This protocol shall guide advanced EMS personnel in selecting the correct IV access type for a given patient. Some flexibility is permitted, and the attending EMS personnel may alter this regimen. When a protocol calls for an IV it refers to vascular access in general, and EMS personnel may choose from the most appropriate method from this list.

Peripheral Intravenous Access - Injection Lock

Any patient in whom IV fluid or IV medication administration is not anticipated pre-hospital. Patients who will receive adenosine IV (as the injection site for the adenosine) should also have a line of NS. Injection locks may also be established as second or subsequent access for patients whose anticipated course of in-hospital care will require multiple lines.

Peripheral Intravenous Access

Any patient who will receive pre-hospital medications or that will require administration of any amount of IV fluids. If not so stated in the specific protocol, peripheral intravenous access may be made at the discretion of the attending EMS provider. As with all therapies instituted the EMS provider will be held accountable to MMS and MMS MC for their actions.

External Jugular Access

Any adult patient in whom other peripheral intravenous access cannot be obtained within two (2) attempts or within 90 seconds, *and* require life-sustaining fluids or medications may receive external jugular access. Alternatively, this may be used as the primary or secondary access in any critical patient or any patient in cardiac arrest.

EZ IO Intraosseous Infusion System

Any adult or pediatric patient in whom other intravenous access cannot be obtained within two (2) attempts or within 90 seconds, *and* require life-sustaining fluids or medications may receive intraosseous access. Alternatively, this may be used as the primary or secondary access in any critical patient or any patient in cardiac arrest.

Indwelling Catheters

EMS personnel may access an indwelling catheter, central line, PICC line, etc. on a patient requiring emergent vascular access only after approval from an On-Line Medical Control physician. It is preferable to use the intraosseous route in most cases.

Usually there are two ports, one red and one blue; the blue port will generally access the venous side. Prior to initiating an infusion, the port must be aspirated to remove any heparin or other anticoagulant that is used to maintain the patency of the device. Aspirate fluid until a blood return is noted before connecting an infusion set.

Implanted Mediports and Dialysis Grafts

EMS personnel will not access implanted Mediports or similar devices, as these require special types of needles so as not to damage the device. Likewise, EMS personnel will not access arteriovenous hemodialysis shunts.

RESUSCITATION AND DNR

CRITERIA:

Pulseless/apneic patient in whom there is some question as to whether to initiate or continue resuscitative measures.

TREATMENT: ADULT or PEDI

EMT	EMT-I	PARAMEDIC
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Withhold or discontinue resuscitative measures in cases of:

- Multi-casualty incidents, as per MCI Triage protocol
- Decapitation
- Decomposition
- Rigor Mortis
- Dependent Lividity
- Visible trauma to the head or chest clearly incompatible with life.
- Valid "Do Not Resuscitate" directives as defined in the following pages.

MEDICAL CONTROL

Withholding or discontinuing resuscitation in all other cases.

NOTES:

To terminate resuscitative efforts after resuscitation has been started on a patient who does not meet the above criteria and does not have a valid DNR document, see [FIELD TERMINATION OF RESUSCITATION](#) protocol.

When assessing an apneic/pulseless patient, the attending EMS personnel must be aware of the following facts:

- Patients presenting in any rhythm, including asystole, can potentially be resuscitated, therefore, the ECG rhythm should not be the determining factor in the decision to initiate or withhold resuscitation.
- "Down time" is an inaccurate decision tool for resuscitation, as the patient may in fact have been perfusing the brain and simply unconscious for some of that time.
- Pupillary size and reactivity are not accurate signs of brain injury or death as numerous factors affect them.

Dependent lividity, or livor mortis, is defined as skin discoloration which occurs in dependent (gravitationally lower) parts of the body after blood circulation has ceased. It generally presents as blue or bluish-black areas, and is caused by the degradation of red blood cells. This sign usually begins to appear within 30 minutes of the cessation of circulation.

Rigor mortis is defined as the stiffening of body parts that occurs generally 2 to 4 hours after death.

TDSHS DNR FORMS

DO NOT RESUSCITE (DNR) orders constitute a patient's pre-arranged refusal of specific therapies. On the TDSHS DNR form the patient has specifically refused CPR, Transcutaneous Pacing, Defibrillation, Advanced Airway Management, and Artificial Ventilation. If the patient has a valid DNR, none of these procedures should be performed, or if they have been started, continued, even if the patient is decompensated but not yet in cardiac arrest.

DNR requests should be honored in the following circumstances:

1. An inpatient resident of a medical facility, including a nursing home, whose chart includes a **TDSHS DNR form or identification device, or written DNR order signed by the patient's physician.**
2. An outpatient client of a home health service whose chart is at the residence and contains a **TDSHS DNR form or identification device, or a written DNR order signed by the patient's physician.**
3. A patient whose family or representative request that no resuscitative measures be taken **AND** who presents a **TDSHS DNR form or identification device.**

In **ALL** DNR cases, the EMS crew must be confident in the authenticity of the paperwork or the identification device and in the patient's identification.

TDSHS approved identification devices include a metal or plastic bracelet and a metal necklace. The device has the outline of the state of Texas with **STOP** across the state, and **Do Not Resuscitate** next to the state outline. Patient identification information is on the back of the device.

The EMS personnel *must* honor a TDSHS DNR whether it is the original, a duplicate (carbonless copy), or a photocopy. If the DNR form is from another state, it may be honored if it is the original document.

If there is *any* doubt, question, conflict, or missing component concerning the paperwork or situation, resuscitative measures should be started and the Medical Control physician contacted for further orders.

If the patient or the patient's representative (family or person holding a Durable Power of Attorney for Healthcare) verbally indicate that they wish resuscitative measures to be initiated, the wishes of the patient or the patient's representative shall supersede the written directive(s).

A directive to withhold resuscitative measures shall not prevent EMS from providing appropriate emergency care to ameliorate suffering, such as oxygen administration, airway suctioning, or authorized analgesia.

Figure: 25 TAC §157.25 (h)(2)

OUT-OF-HOSPITAL DO-NOT-RESUSCITATE (OOH-DNR) ORDER

TEXAS DEPARTMENT OF STATE HEALTH SERVICES

Print Form



This document becomes effective immediately on the date of execution for health care professionals acting in out-of-hospital settings. It remains in effect until the person is pronounced dead by authorized medical or legal authority or the document is revoked. Comfort care will be given as needed.

Person's full legal name _____ Date of birth _____ Male
 Female

A. Declaration of the adult person: I am competent and at least 18 years of age. I direct that none of the following resuscitation measures be initiated or continued for me: cardiopulmonary resuscitation (CPR), transcutaneous cardiac pacing, defibrillation, advanced airway management, artificial ventilation.

Person's signature _____ Date _____ Printed name _____

B. Declaration by legal guardian, agent or proxy on behalf of the adult person who is incompetent or otherwise incapable of communication:

I am the: legal guardian; agent in a Medical Power of Attorney; OR proxy in a directive to physicians of the above-noted person who is incompetent or otherwise mentally or physically incapable of communication.

Based upon the known desires of the person, or a determination of the best interests of the person, I direct that none of the following resuscitation measures be initiated or continued for the person: cardiopulmonary resuscitation (CPR), transcutaneous cardiac pacing, defibrillation, advanced airway management, artificial ventilation.

Signature _____ Date _____ Printed name _____

C. Declaration by a qualified relative of the adult person who is incompetent or otherwise incapable of communication: I am the above-noted person's:

spouse, adult child, parent, OR nearest living relative, and I am qualified to make this treatment decision under Health and Safety Code §166.088.

To my knowledge the adult person is incompetent or otherwise mentally or physically incapable of communication and is without a legal guardian, agent or proxy. Based upon the known desires of the person or a determination of the best interests of the person, I direct that none of the following resuscitation measures be initiated or continued for the person: cardiopulmonary resuscitation (CPR), transcutaneous cardiac pacing, defibrillation, advanced airway management, artificial ventilation.

Signature _____ Date _____ Printed name _____

D. Declaration by physician based on directive to physicians by a person now incompetent or nonwritten communication to the physician by a competent person: I am the above-noted person's attending physician and have:

seen evidence of his/her previously issued directive to physicians by the adult, now incompetent; OR observed his/her issuance before two witnesses of an OOH-DNR in a nonwritten manner.

I direct that none of the following resuscitation measures be initiated or continued for the person: cardiopulmonary resuscitation (CPR), transcutaneous cardiac pacing, defibrillation, advanced airway management, artificial ventilation.

Attending physician's signature _____ Date _____ Printed name _____ Lic # _____

E. Declaration on behalf of the minor person: I am the minor's: parent; legal guardian; OR managing conservator.

A physician has diagnosed the minor as suffering from a terminal or irreversible condition. I direct that none of the following resuscitation measures be initiated or continued for the person: cardiopulmonary resuscitation (CPR), transcutaneous cardiac pacing, defibrillation, advanced airway management, artificial ventilation.

Signature _____ Date _____

Printed name _____

TWO WITNESSES: (See qualifications on backside.) We have witnessed the above-noted competent adult person or authorized declarant making his/her signature above and, if applicable, the above-noted adult person making an OOH-DNR by nonwritten communication to the attending physician.

Witness 1 signature _____ Date _____ Printed name _____

Witness 2 signature _____ Date _____ Printed name _____

Notary in the State of Texas and County of _____. The above noted person personally appeared before me and signed the above noted declaration on this date: _____

Signature & seal: _____ Notary's printed name: _____ Notary Seal

[Note: Notary cannot acknowledge the witnessing of the person making an OOH-DNR order in a nonwritten manner]

PHYSICIAN'S STATEMENT: I am the attending physician of the above-noted person and have noted the existence of this order in the person's medical records. I direct health care professionals acting in out-of-hospital settings, including a hospital emergency department, not to initiate or continue for the person: cardiopulmonary resuscitation (CPR), transcutaneous cardiac pacing, defibrillation, advanced airway management, artificial ventilation.

Physician's signature _____ Date _____
Printed name _____ License # _____

F. Directive by two physicians on behalf of the adult, who is incompetent or unable to communicate and without guardian, agent, proxy or relative: The person's specific wishes are unknown, but resuscitation measures are, in reasonable medical judgment, considered ineffective or are otherwise not in the best interests of the person. I direct health care professionals acting in out-of-hospital settings, including a hospital emergency department, not to initiate or continue for the person: cardiopulmonary resuscitation (CPR), transcutaneous cardiac pacing, defibrillation, advanced airway management, artificial ventilation.

Attending physician's signature _____ Date _____ Printed name _____ Lic# _____

Signature of second physician _____ Date _____ Printed name _____ Lic# _____

Physician's electronic or digital signature must meet criteria listed in Health and Safety Code §166.082(c).

All persons who have signed above must sign below, acknowledging that this document has been properly completed.

Person's signature _____ Guardian/Agent/Proxy/Relative signature _____

Attending physician's signature _____ Second physician's signature _____

Witness 1 signature _____ Witness 2 signature _____ Notary's signature _____

This document or a copy thereof must accompany the person during his/her medical transport.

INSTRUCTIONS FOR ISSUING AN OOH-DNR ORDER

PURPOSE: The Out-of-Hospital Do-Not-Resuscitate (OOH-DNR) Order on reverse side complies with Health and Safety Code (HSC), Chapter 166 for use by qualified persons or their authorized representatives to direct health care professionals to forgo resuscitation attempts and to permit the person to have a natural death with peace and dignity. This Order does NOT affect the provision of other emergency care, including comfort care.

APPLICABILITY: This OOH-DNR Order applies to health care professionals in out-of-hospital settings, including physicians' offices, hospital clinics and emergency departments.

IMPLEMENTATION: A competent adult person, at least 18 years of age, or the person's authorized representative or qualified relative may execute or issue an OOH-DNR Order. The person's attending physician will document existence of the Order in the person's permanent medical record. The OOH-DNR Order may be executed as follows:

Section A - If an adult person is competent and at least 18 years of age, he/she will sign and date the Order in Section A.

Section B - If an adult person is incompetent or otherwise mentally or physically incapable of communication and has either a legal guardian, agent in a medical power of attorney, or proxy in a directive to physicians, the guardian, agent, or proxy may execute the OOH-DNR Order by signing and dating it in Section B.

Section C - If the adult person is incompetent or otherwise mentally or physically incapable of communication and does not have a guardian, agent, or proxy, then a qualified relative may execute the OOH-DNR Order by signing and dating it in Section C.

Section D - If the person is incompetent and his/her attending physician has seen evidence of the person's previously issued proper directive to physicians or observed the person competently issue an OOH-DNR Order in a nonwritten manner, the physician may execute the Order on behalf of the person by signing and dating it in Section D.

Section E - If the person is a **minor** (less than 18 years of age), **who has been diagnosed by a physician as suffering from a terminal or irreversible condition**, then the minor's parents, legal guardian, or managing conservator may execute the OOH-DNR Order by signing and dating it in Section E.

Section F - If an adult person is incompetent or otherwise mentally or physically incapable of communication and does not have a guardian, agent, proxy, or available qualified relative to act on his/her behalf, then the attending physician may execute the OOH-DNR Order by signing and dating it in Section F with concurrence of a second physician (signing it in Section F) who is not involved in the treatment of the person or who is not a representative of the ethics or medical committee of the health care facility in which the person is a patient.

In addition, the OOH-DNR Order must be signed and dated by two competent adult witnesses, who have witnessed either the competent adult person making his/her signature in section A, or authorized declarant making his/her signature in either sections B, C, or E, and if applicable, have witnessed a competent adult person making an OOH-DNR Order by nonwritten communication to the attending physician, who must sign in Section D and also the physician's statement section.

Optionally, a competent adult person or authorized declarant may sign the OOH-DNR Order in the presence of a notary public. However, a notary cannot acknowledge witnessing the issuance of an OOH-DNR in a nonwritten manner, which must be observed and only can be acknowledged by two qualified witnesses. Witness or notary signatures are not required when two physicians execute the OOH-DNR Order in section F. The original or a copy of a fully and properly completed OOH-DNR Order or the presence of an OOH-DNR device on a person is sufficient evidence of the existence of the original OOH-DNR Order and either one shall be honored by responding health care professionals.

REVOCAATION: An OOH-DNR Order may be revoked at ANY time by the person, person's authorized representative, or physician who executed the order. Revocation can be by verbal communication to responding health care professionals, destruction of the OOH-DNR Order, or removal of all OOH-DNR identification devices from the person.

AUTOMATIC REVOCAATION: An OOH-DNR Order is automatically revoked for a person known to be pregnant or in the case of unnatural or suspicious circumstances.

DEFINITIONS

Attending Physician: A physician, selected by or assigned to a person, with primary responsibility for the person's treatment and care and is licensed by the Texas Medical Board, or is properly credentialed and holds a commission in the uniformed services of the United States and is serving on active duty in this state. [HSC §166.002(12)].

Health Care Professional: Means physicians, nurses, physician assistants and emergency medical services personnel, and, unless the context requires otherwise, includes hospital emergency department personnel. [HSC §166.081(5)]

Qualified Relative: A person meeting requirements of HSC §166.088. It states that an adult relative may execute an OOH-DNR Order on behalf of an adult person who has not executed or issued an OOH-DNR Order and is incompetent or otherwise mentally or physically incapable of communication and is without a legal guardian, agent in a medical power of attorney, or proxy in a directive to physicians, and the relative is available from one of the categories in the following priority: 1) person's spouse; 2) person's reasonably available adult children; 3) the person's parents; or, 4) the person's nearest living relative. Such qualified relative may execute an OOH-DNR Order on such described person's behalf.

Qualified Witnesses: Both witnesses must be competent adults, who have witnessed the competent adult person making his/her signature in section A, or person's authorized representatives making his/her signature in either Sections B, C, or E on the OOH-DNR Order, or if applicable, have witnessed the competent adult person making an OOH-DNR by nonwritten communication to the attending physician, who signs in Section D. Optionally, a competent adult person, guardian, agent, proxy, or qualified relative may sign the OOH-DNR Order in the presence of a notary instead of two qualified witnesses. Witness or notary signatures are not required when two physicians execute the order by signing Section F. One of the witnesses must meet the qualifications in HSC §166.003(2), which requires that at least one of the witnesses not: (1) be designated by the person to make a treatment decision; (2) be related to the person by blood or marriage; (3) be entitled to any part of the person's estate after the person's death either under a will or by law; (4) have a claim at the time of the issuance of the OOH-DNR against any part of the person's estate after the person's death; or, (5) be the attending physician; (6) be an employee of the attending physician or (7) an employee of a health care facility in which the person is a patient if the employee is providing direct patient care to the patient or is an officer, director, partner, or business office employee of the health care facility or any parent organization of the health care facility.

Report problems with this form to the Texas Department of State Health Services (DSHS) or order OOH-DNR Order/forms or identification devices at (512) 834-6700.

Declarant's, Witness', Notary's, or Physician's electronic or digital signature must meet criteria outlined in HSC §166.011

RAPID TRANSPORT

Occasionally, EMS personnel will encounter a patient whose injury can only be treated definitively with surgery. When confronted with such a patient, the attending EMS personnel shall institute the basic interventions noted here and begin transport to an appropriate facility **AS SOON AS POSSIBLE**. Reasons for any prolonged scene time (> 10 minutes) should be documented.

ONLY THE FOLLOWING INTERVENTIONS ARE TO BE DONE PRIOR TO INITIATING TRANSPORT:

- Spinal immobilization
- BLS airway and ventilation procedures
- Intubation **IF** it can be accomplished rapidly
- Surgical airway
- Occlusion of open chest wounds
- Vital signs (may use peripheral pulses to estimate see [Diagnostic Tools and Procedures](#) reference)
- Freeing patient from entrapment

All other interventions are to be done once en route to the hospital.

The following represent patients for whom rapid transport is required:

- Adult and Pediatric Trauma as defined in [Definition of Terms](#)
- Head Injury with evidence of increasing ICP
- CVA with onset < 12 hours
- Suspected aortic aneurysm
- Suspected ectopic pregnancy, abruptio placenta, or uterine rupture
- All abdominal pain patients with unstable vital signs (tachycardia with normotension, hypotension)
- Obstetrical emergencies resulting in possible fetal distress, such as limb presentation, breech delivery, or prolapsed cord
- GI bleeding with unstable vital signs (tachycardia with normotension or hypotension)
- Any other patient requiring urgent surgical intervention

Although on-scene diagnostic and therapeutic interventions are required for the following, on-scene time should be limited:

- Acute MI

AIR MEDICAL TRANSPORT UTILIZATION

This protocol provides guidelines and authorization for the use of helicopter ambulance to transport a patient directly from a scene.

By standing order, EMS personnel are authorized to utilize helicopter ambulances to evacuate patients at their discretion. The following are guidelines for their use; however, these do not represent absolute rules.

THE ATTENDING EMS PERSONNEL ARE RESPONSIBLE FOR SELECTING THE MODE OF TRANSPORT MOST BENEFICIAL FOR THE PATIENT, AND WILL BE HELD ACCOUNTABLE BY MMS MEDICAL CONTROL FOR THEIR DECISION.

The primary indication for the use of a helicopter ambulance is when the helicopter can deliver the patient to definitive care faster than the ground unit can. Factors to take into account when considering Air Medical Transport include:

- Time of day/Traffic conditions
- ETA of helicopter
- Weather conditions
- Extrication time required

When requesting for an Air Medical transport unit response, the following information should be reported to the responding agency (via dispatcher or direct communication with aircraft):

- LZ location (use North, South, East, West directions)
- On scene hazards (wires, debris, etc. BE SPECIFIC)
- Patient weight, especially if patient is > 300 lbs.
- Brief description of patient condition

WMD / BIOTERRORISM**CRITERIA:**

Any condition presented by a true Weapons of Mass Destruction/Bioterrorism incident that is not directly covered by the scope of these protocols and treatments. **WITH:**

- Disaster declaration by Federal, State, or Local government in response to a WMD/Bioterrorism incident; or on approval of the Medical Director, On Line Medical Control Physician, or Medical Control Officer

TREATMENT: ADULT or PEDI**EMT****EMT-I****PARAMEDIC**

Personal safety
MCI START triage as needed
Decontamination of patients
CABC's
V/S

Treat known and unknown agents in accordance with accepted and established medical practices as found in these protocols, or other accepted printed national curriculum for WMD Agents (see reference page) and otherwise limited only by available medical supplies, equipment and medications.

MEDICAL CONTROL

None

NOTES:

The following list is recommended as reference material which may be used to provide treatment guidelines for patients from WMD / Bioterrorism Incidents:

- Jane's Chem-Bio Handbook, 2nd Ed.
- USAMRIID's Medical Management of Biological Casualties Handbook, 4th Ed.
- Medical Management of Radiological Casualties Handbook, 2nd Ed.

Ensure that patients are adequately decontaminated prior to transporting them from the scene.

In the event that possible nerve agent exposure is identified and Mark I autoinjectors are provided by responding Haz Mat or Disaster Response agencies, personnel are authorized to administer these using the following guidelines:

Mild Exposure	Pupils constricted, nasal secretions, slight dyspnea	1 Mark I autoinjector kit
Moderate Exposure	Above s/s plus: significant dyspnea and secretions, diarrhea, vomiting and general weakness	2 Mark I autoinjector kits
Significant Exposure	Above s/s plus: loss of consciousness, copious secretions, paralysis, seizures	3 Mark I autoinjector kits

Treat seizures as per the Seizure Protocol.

MULTI-CASUALTY INCIDENT TRIAGE

In the event of a multi-casualty incident (as defined in [Definition of Terms](#)), the following is the triage protocol to be used.

MMS EMS units will employ the Simple Triage and Rapid Transport (START) system for managing multi-casualty events.

The first arriving medical personnel will clear the area of "walking wounded" by instructing them to move to a designated area. As additional rescuers arrive, these individuals will be assessed using the method described below. Those patients that remain will immediately be evaluated using the following system.

All patients are evaluated using three parameters; **Respiration, Pulse, and Mental Status (RPM)**. Assessment of these parameters will result in the patient being assigned to one of three categories; **dead/non-salvageable, critical/immediate, and delayed**. This assessment of each patient should take no longer than 60 seconds. The assessment of each parameter should be performed as follows.

Respiration:

If adequate, move on. If inadequate, attempt to improve ventilation using *basic* maneuvers such as removal of debris and positioning. The patient is then classified as follows.

- | | |
|---|---|
| <p><u>IF</u></p> <ul style="list-style-type: none"> • No respiratory effort • Respiratory rate > 30 OR requires airway assistance • Respiratory rate < 30 | <p><u>THEN</u></p> <p>dead/non-salvageable</p> <p>critical/immediate</p> <p>delayed</p> |
|---|---|

Pulse:

The provider may use either capillary refill or the radial pulse to evaluate this component. The patient is classified as follows.

- | | |
|--|--|
| <p><u>IF</u></p> <ul style="list-style-type: none"> • CRT > 2 seconds OR no radial pulse present • CRT < 2 seconds OR palpable radial pulse | <p><u>THEN</u></p> <p>critical/immediate</p> <p>go to next assessment</p> |
|--|--|

Mental Status:

The assessment of the patient's level of consciousness will result in classification as follows.

- | | |
|--|---|
| <p><u>IF</u></p> <ul style="list-style-type: none"> • Unconscious • Altered level of consciousness • Normal level of consciousness | <p><u>THEN</u></p> <p>critical/immediate</p> <p>critical/immediate</p> <p>delayed</p> |
|--|---|

Patients meeting the "dead/non-salvageable" designation criteria in the setting of an active MCI qualify for no resuscitation attempts **on standing order**, and do not require Medical Control contact for a DNR order.

DESTINATION DETERMINATION

This protocol shall serve as the basis for the decision by both field EMS personnel and on-line Medical Control as to the transport destinations of patients. This protocol is a standing order. **The patient should always be transported to the facility of their (or their representative's) choice, unless the facility is medically inappropriate or is outside the geographic boundaries established by the service's operational policies.** If a patient requests transport to a hospital outside the geographic boundaries established by the service's operational policies, refer to MMS Policy 2009-13 Patient Referral for guidelines on how to transfer patient care to an outside agency.

Should the patient or the patient's representative request a facility which is in conflict with this protocol or which the attending EMS personnel feel is inappropriate for the patient's medical problem, on-line Medical Control shall be consulted for the final decision as to the patient's transport destination.

In the event that the Dallas Area Trauma System should activate the emergency diversion system for trauma patients, you may be diverted from a facility listed in this document to a secondary trauma center by on-line Medical Control. Should you receive such an order, it shall supersede this protocol.

The following represent patient types for which a specific facility or set of facilities is designated as the appropriate transport destination. EMS personnel **MUST** transport patients meeting these type definitions to the facilities noted here, unless ordered otherwise by on-line Medical Control.

Destinations for Specific Conditions:

Acute Stroke – facilities with **Yes 3** can treat patients with a stroke up to 3 hours from the onset of symptoms (last known normal time); facilities with **Yes 12** can treat patients who are within 12 hours from the onset of symptoms.

Pedi Critical Care – includes Neurosurgery and Critical Care Medicine for patients 12 and younger.

Emergency Psychiatric Detention

Psychiatric patients with any medical condition requiring treatment (overdose, lacerations, etc.) should be transported to the closest appropriate hospital for medical treatment/clearance. If the patient has no condition which requires medical treatment, the following applies:

- Patients in Dallas County should be transported to Parkland
- Patients in Denton or Collin County should be transported to the closest appropriate hospital – arrangements for transfer to an inpatient psychiatric facility will be made by the county MHMR office.

Sexual Assault Exams

Transport to the following facilities based upon where the alleged assault occurred:

- Dallas County: Presbyterian Dallas, Parkland, Children's Medical Center (<18)
- Denton County: Baylor Carrollton, Denton Regional
- Collin County: Medical Center of Plano, Presbyterian Plano, Children's Legacy (<18 y.o.)

DFW Area Hospital Capability Chart: December 1, 2010

	AMI – post arrest ROSC	Acute Stroke	Critical Trauma	Critical Burns	Neuro	High Risk OB	Hyperbaric	Amputations	Pedi Critical Care
Baylor Medical Center at Carrollton						Yes			
Baylor Medical Center at Irving						Yes			
Baylor Regional Medical Center at Grapevine	Yes					Yes			
Baylor Regional Medical Center at Plano					Yes				
Baylor University Medical Center	Yes	Yes up to 3 hrs	Yes		Yes	Yes		Yes	
The Heart Hospital Baylor Plano	Yes								
Centennial Medical Center	Yes				Yes	Yes			
Children's Medical Center of Dallas			Ages 13 and under		Yes			Yes	Ages 17 and under
Children's Medical Center at Legacy									
Dallas Medical Center (RHD)	Yes				No Neuro service	No OB service			
Denton Regional Medical Center	Yes		Level 3			Yes			
Las Colinas Medical Center	Yes								

	AMI – post arrest ROSC	Acute Stroke	Critical Trauma	Critical Burns	Neuro	High Risk OB	Hyperbaric	Amputations	Pedi Critical Care
Medical Center of Lewisville						Yes			
Medical Center of Plano	Yes	Yes up to 12 hrs	Yes		Yes	Yes			
Medical City Dallas Hospital	Yes	Yes up to 12 hrs			Yes	Yes		Yes	Yes
Methodist Dallas Medical Center	Yes	Yes up to 12 hrs	Yes		Yes	Yes			
Methodist Richardson Medical Center					Yes	Yes			
Parkland Health & Hospital System		Yes up to 3 hrs	Yes	Yes	Yes	Yes		Yes	
Presbyterian Hospital Dallas		Yes up to 3 hrs			Yes	Yes	Yes		
Presbyterian Hospital Denton	Yes	Yes up to 3 hrs				Yes		Yes	
Presbyterian Hospital Flower Mound						Yes			
Presbyterian Hospital Plano	Yes		Level 3		Yes	Yes			
UT Southwestern University Hospitals	Yes	Yes up to 12 hrs			Yes	Yes		Yes	

Hospital Notes:

Baylor Medical Center at Carrollton (formerly Trinity Medical Center): MMS On-Line Medical Control site.

Children's Medical Center: Can take medical patients up to 18 years of age; trauma patients up to and including those 13 years of age.

Children's Medical Center at Legacy: Can take medical patients up to 18 years of age.

UT Southwestern University Hospital (formerly St. Paul): bariatric capability for CVA patients. EMS patients requesting transport to Zale-Lipshy Hospital should go UT Southwestern E.D. unless they are a direct admit to Zale-Lipshy.

Patients who access EMS via 911 should not be transported directly to “specialty hospitals” (Psychiatric, Rehab, Surgical, etc.) or “free-standing ER’s” (minor emergency clinics). These patients should be delivered to a hospital emergency department.

The following facilities should not receive emergency patients:

- North Dallas Rehabilitation Hospital
- HealthSouth – Dallas Hospital
- Dallas Rehabilitation Institute
- Kindred Hospitals
- Medical Arts Hospital
- Zale-Lipshy Hospital
- Methodist Spine Hospital
- Baylor Frisco
- Mary Shiels Hospital
- Scottish Rite Hospital
- Baylor Rehabilitation Hospital
- Charter Hospital of Dallas
- Horizon Specialty Hospital
- Baylor Restorative Care
- Plano Rehabilitation Hospital
- American Transitional Hospital

METROCREST MEDICAL SERVICES

PROTOCOLS FOR THERAPY

Protocols are Divided by Body Section:

- [Head/Neuro](#)
- [Airway/Breathing](#)
- [Chest/Cardiac](#)
- [Abdomen/OB](#)
- [Extremity](#)
- [Environmental/Metabolic](#)
- [Multisystem Injury](#)

ALTERED MENTAL STATUS/UNKNOWN ETIOLOGY

CRITERIA:

Unresponsive or disoriented patient

- **WITHOUT** clear mechanism for altered mentation (i.e., demonstrable hypoglycemia, head injury, post-ictal state, etc.)

ADULT	PEDI
EMT	EMT
CABC's O ₂ V/S Blood Glucose Determination: IF below 80 mg/dl, treat per hypoglycemia protocol	CABC's O ₂ V/S IF blood glucose is unclear, unobtainable or below 80 mg/dl, OR (40 mg/dl for infants < 1 month old): treat per hypoglycemia protocol
EMT - I	EMT - I
IV Naloxone 0.5 - 2 mg IV or IN: • May repeat every 10-15 min PRN if patient responds to initial dose, up to 8 mg total	IV Naloxone 0.1 mg/kg IV or IN • Max. single dose of 2.0 mg May repeat every 10-15 minutes PRN if patient responds to initial dose
PARAMEDIC	PARAMEDIC
ECG monitoring	ECG monitoring
MEDICAL CONTROL	MEDICAL CONTROL
None	None

NOTES:

Oxygen should be provided to maintain SpO₂ of > 95%.

IV should be run at TKO unless hypotension is present (titrate to systolic BP of > 100 mm Hg).

Naloxone will reverse opiates (heroin, morphine, methadone, codeine) in relatively low doses (0.4 - 2 mg IV). Numerous other substances will respond to naloxone but require doses of > 2 mg IV. Patients with constricted pupils, respiratory depression, or history of drug use should receive naloxone. If IV access is not available or is delayed, naloxone may be administered IN or IM.

CEREBROVASCULAR ACCIDENT (STROKE)

CRITERIA:

Altered mentation or slurred speech **WITHOUT** other probable etiology, **OR**
 Unilateral weakness, paralysis, facial drooping, or other neurological signs

ADULT

EMT

CABC's
 O₂
 V/S
 Elevate Head of Stretcher 30°
 Assess using Cincinnati Prehospital Stroke Screen
IF onset of symptoms < 12 hours, transport to Stroke Center
 Blood Glucose Determination: **IF** below 80 mg/dl, treat per [hypoglycemia](#) protocol

EMT - I

IV TKO

PARAMEDIC

ECG
IF malnutrition or alcoholism is suspected:
 - **Thiamine 100 mg IV or IM**
 For severe nausea/vomiting:
 - **Promethazine 6.25 - 12.5 mg IV**
 OR
 - **Ondansetron 4 mg IV** for severe nausea
IF intubation is required:
 - **Lidocaine 1.5 mg/kg IV** 2-3 minutes prior to intubation

MEDICAL CONTROL

None

PEDI

EMT

CABC's
 O₂
 V/S
 Transport to Pediatric Critical Care Facility
IF blood glucose is unclear, unobtainable or below 80 mg/dl, **OR** (40 mg/dl for infants < 1 month old):
 treat per [hypoglycemia](#) protocol

EMT - I

IV TKO

PARAMEDIC

ECG
 For severe nausea/vomiting:
 - **Ondansetron 0.1 mg/kg, max. dose 4 mg**
IF intubation is required:
 - **Lidocaine 1.5 mg/kg IV** 2-3 minutes prior to intubation

MEDICAL CONTROL

None

NOTES:

Cincinnati Prehospital Stroke Screen:

- **Facial droop:** Have patient smile and show their teeth.
- **Arm drift:** Have patient close eyes and hold arms straight out in front of them for 10 seconds.
- **Speech:** Have the patient repeat – “You can’t teach an old dog new tricks.”

Failure of any one of the tests constitutes a positive CPSS and indicates the patient is likely experiencing an acute stroke.

Oxygen should be provided to maintain SpO₂ of > 95%.

Rapid transport of the CVA patient should be considered if the time from the onset of symptoms is less than 12 hours. Thrombolytics or interventional neurosurgery may be used to re-perfuse the brain in cases where an embolus is causing the CVA, however there is a narrow window of opportunity in which to accomplish this therapy (3 hours from time of onset of symptoms for TPA and 12 hours for neurosurgery). In such cases, non-critical advanced procedures should be done en route to a destination appropriate for the care of such patient.

Acute Stroke facilities listed in the Destination Determination section with **Yes 3** can treat patients with a stroke up to 3 hours from the onset of symptoms (last known normal time); facilities with **Yes 12** can treat patients who are within 12 hours from the onset of symptoms.

IV should be NS at TKO if IV medication administration is anticipated. Otherwise, IV access may be by injection lock.

If at all possible, avoid the use of D50% in the suspected CVA patient, as it may worsen cerebral edema and/or intracranial pressure (ICP). If you are confident that a *low* Blood Glucose reading is valid AND the patient has signs or symptoms indicating hypoglycemia, administer D50%. In this setting, treat the patient with the hypoglycemia protocol.

Careful assessment of the history of the present illness will help the provider differentiate between hypertensive crisis and CVA. Cerebrovascular accidents occur suddenly and, usually, their symptoms do not worsen significantly. The abrupt collapse of a patient who is then found to be hypertensive or the sudden onset of slurred speech or severe headache without precipitating symptoms are most likely to represent CVA regardless of the patient's BP upon EMS arrival. Conversely, a patient who has felt "bad" for several hours and gradually has developed vision disturbances and unilateral weakness and presents with marked hypertension to EMS is probably a true hypertensive crisis. If hypertensive crisis is suspected, contact Medical Control for guidance.

In the CVA patient, acute hypertension is generally not treated unless it is extreme (e.g., systolic greater than 250 or diastolic greater than 160). Some increase in the BP is needed to help perfuse cells in and around the area of cerebral ischemia or hemorrhage.

If the patient has signs or symptoms of rising ICP, such as hypertension and bradycardia or severe nausea/vomiting, transport ASAP.

Consider using an antiemetic for nausea/vomiting, as this may worsen ICP. Promethazine may cause sedation, so consider reducing the dose to 6.5 mg for patients over 60 years of age, or using Ondansetron. Promethazine can also irritate the vasculature and should be diluted in 9 ml's of NS prior to slow IV administration.

EYE INJURIES

CRITERIA:

Injury to the globe, open or closed, including: corneal abrasion, foreign body in eye, chemical burn, lacerated or avulsed globe, "arc" burn of globe

ADULT
EMT

CABC's
V/S
IF open injury to globe:
- Patch both eyes
IF chemical burn or foreign body:
- Remove foreign body if not penetrated globe
- Flush continuously with normal saline

PARAMEDIC

For pain or to facilitate flushing:
- **Tetracaine 1 - 2 gtts** in affected eye
May repeat PRN

MEDICAL CONTROL

None None

PEDI
EMT

CABC's
V/S
IF open injury to globe:
- Patch both eyes
IF chemical burn or foreign body:
- Remove foreign body if not penetrated globe
- Flush continuously with normal saline

PARAMEDIC

For pain or to facilitate flushing:
- **Tetracaine 1 - 2 gtts** in affected eye
May repeat PRN

MEDICAL CONTROL

NOTES:

Chemical burns can cause catastrophic, rapid damage. Therefore it is imperative to intervene and stop the reaction as soon as possible with saline flushing of the eye.

Tetracaine may be used in chemical eye injuries in order to affect flushing with normal saline. The flushing is of paramount importance, and takes precedence over all other therapies.

Flushing of a non-intact (disrupted) globe may cause serious injury to the eye. Flushing of the eye may result in vagal stimulation, with transient hypotension, dizziness, and nausea. These symptoms will usually resolve when flushing is stopped.

The disrupted globe must be immobilized. The best way to immobilize the eye is to obstruct vision in both eyes by patching.

When patching or covering an eye, be sure that no pressure is exerted on the globe. An injury which does not involve or disrupt the globe, such as a simple corneal abrasion, requires the patching of only the affected eye. However, if you are not *certain* of the extent of the injury, patch both eyes.

A foreign body which penetrates the globe is left in place, supported if necessary, and the eye immobilized by patching both eyes.

Tetracaine may initially burn or sting for a few seconds. Warn the patient of this possibility before placing drops.

HEAD INJURY

CRITERIA:

Injury to the head with altered mental status or loss of consciousness, with the exception of patients meeting Multi-System Trauma criteria

ADULT	PEDI
EMT	EMT
CABC's O ₂ V/S TRANSPORT AS SOON AS POSSIBLE	CABC's O ₂ V/S TRANSPORT AS SOON AS POSSIBLE
EMT - I	EMT - I
IV TKO	IV TKO
PARAMEDIC	PARAMEDIC
ECG IF intubation is required: - Lidocaine 1.5 mg/kg IV 2-3 minutes prior to intubation Ventilate to maintain ETCO ₂ near 35 mmHg IF seizure: Treat per SEIZURE protocol	ECG IF intubation is required: - Lidocaine 1.5 mg/kg IV 2-3 minutes prior to intubation Ventilate to maintain ETCO ₂ near 35 mmHg IF seizure: Treat per SEIZURE protocol
MEDICAL CONTROL	MEDICAL CONTROL
None None	

NOTES:

Mental status is by far the single most important finding in determining the significance of a head injury. Vital signs may reflect increasing intracranial pressure or brain injury (Cushing's reflex: increased blood pressure, decreased pulse rate, and irregular respirations), but are far less reliable than mental status. This includes information about a loss of consciousness prior to your arrival. If the altered mental status is out of proportion for the apparent injury then consider the altered mental status protocol.

The best method for decreasing or limiting ICP in the head injured patient is through intubation and ventilation with 100% oxygen. Always use the BVM to control tidal volume and/or respiratory rate in the significantly obtunded head injured patient. Use the ETCO₂ detector to guide the ventilatory rate, ideally to keep ETCO₂ at 35 mmHg and SpO₂ > 95%.

Intubation should be utilized to secure the airway and permit ventilation in the patient whose mental status permits. Generally any patient who has a Glasgow Coma score of 7 or less should be intubated. Oral, pharmacologically assisted intubation is preferred in the deeply comatose patient. In the event the patient has increased masseter tone (clenched jaws), nasal intubation is the technique of choice.

Nasotracheal intubation should be used with caution in patients with nasal fractures, basilar skull fractures, deviated septum, or known or suspected nasal obstruction. See [Nasotracheal Intubation](#) procedure. Nasotracheal intubation is contraindicated for infants (< 1 year old).

Approximately 5-20% of head injury patients have cervical spine injury so if oral intubation is to be used, extreme caution and modified technique must be employed. An additional person should provide manual cervical spine immobilization during intubation attempts.

Intravenous access should be large bore and the fluid of choice is NS. IV's should be kept at a keep open rate unless patient is hypotensive. Remember that head injuries rarely result in hypovolemia so if hypotension is seen, reassess for other injuries.

Helmet Removal:

If the head injured patient is wearing a helmet, such as for motorcycle riding or cycling, the helmet should be removed by the prehospital personnel prior to completing spinal immobilization as the helmet will interfere with achieving proper spinal alignment.

Football helmets may be left in place during immobilization, with the face shield removed, in the following situations:

- The helmet fits properly and does not allow the patient's head to move within the helmet, and,
- The shoulder pads are in place, and,
- Adequate padding is available to fill any void space behind the shoulder pads.

If all criteria are not met, both the helmet and shoulder pads should be removed. In any situation, at a minimum, the face shield should be removed.

If helmet removal is required, helmets must be removed carefully, using a minimum of two rescuers, so as not to cause movement of the cervical spine.

SEIZURES

CRITERIA:

Actively seizing patient **OR**
 Witnessed, reported, or suspected seizure prior to EMS arrival

ADULT
EMT
CABC's O ₂ V/S Blood Glucose Determination
EMT - I

IV TKO

PARAMEDIC

ECG

IF actively seizing:

- **Lorazepam 2 - 4 mg IV**, may repeat once in 10 minutes

IF IV unobtainable:

- **Midazolam 0.3 mg/kg IN up to 5 mg**

IF seizure refractory to lorazepam:

Midazolam 0.1 mg/kg IV up to 5 mg

IF blood glucose is below 80 mg/dl, treat per [hypoglycemia](#) protocol

MEDICAL CONTROL

Additional **midazolam** beyond 10 mg total -
 or- **lorazepam** beyond 8 mg total

PEDI
EMT
CABC's O ₂ V/S Blood Glucose Determination
EMT - I

IV TKO

PARAMEDIC

ECG

IF actively seizing:

- **Lorazepam 0.1 mg/kg IV, up to 2 mg max**, may repeat once in 10 minutes

IF IV unobtainable:

- **Midazolam 0.3 mg/kg IN, up to 5 mg max**

IF blood glucose is below 80 mg/dl (40 mg/dl for infants < 1 month old), treat per [hypoglycemia](#) protocol

IF febrile:

- **APAP 15 mg/kg PO/PR**

IF prolonged BVM ventilation, [NG/OG intubation](#)

MEDICAL CONTROL

Midazolam 0.1 mg/kg IV OR 0.3 mg/kg IN if seizure refractory to lorazepam, max. single dose of **5.0 mg**

Naloxone 0.1 mg/kg IV for prolonged altered mentation, max. single dose of **2.0 mg**

NOTES:

Oxygen should be provided to maintain SpO₂ of > 95% in the post-ictal patient. This may require the use of airway adjuncts, and ventilatory support with the BVM. Aggressive, early oxygenation is a *must* in the seizure patient, both active and post-ictal. Oxygen alone will shorten the post-ictal state and raise the seizure threshold. Conversely, hypoxia and the associated acidosis are major factors in the development of status seizures.

Temperature can be a major factor in seizures. Increased body temperature lowers the seizure threshold (makes a seizure more likely), while lowered temperature raises it. **Always** cool the febrile child with seizures. Use lukewarm water and sponge the child over the entire body, especially the head, axillary areas, and groin. **DO NOT OVERCOOL**; if the child begins to shiver, stop cooling and lightly cover the child. Shivering will produce enormous heat. Use serial tympanic or rectal temps to guide cooling; titrate to a temp of 100 degrees F.

Seizures generally are classified into four categories, and these terms should be used by the EMS personnel to describe the seizure:

- Tonic-Clonic (generalized, "grand-mal" convulsion)
- Absence Seizure (altered level of consciousness only, no convulsion)
- Partial Seizure (focal, or non-generalized or localized convulsion)
 - Simple Partial Seizure – no altered mental status
 - Complex Partial Seizure – with altered mental status
- Psychomotor (behavioral/personality manifestation)

Blood glucose should **always** be assessed in the seizure patient. Hypoglycemia will significantly lower seizure threshold, and represents a life-threatening cause of convulsions. Additionally, convulsions may cause hypoglycemia in an otherwise normoglycemic patient.

Hypoglycemia is common in infants and children with a hypoxic insult or other stress. The blood glucose levels should be monitored and D50% or D25% 0.5 mg/kg administered if indicated. For the infant < 10 kg, dilute D50% with an equivalent quantity of NS to create D25%, yielding 0.25 Gm/ml.

NG/OG intubation is indicated in any pediatric patient with decreased level of consciousness who is receiving BVM ventilation. Gastric distention caused by the introduction of air will seriously restrict the ventilatory status of a child.

ALLERGIC REACTION

CRITERIA:

<u>Mild</u>	<u>Moderate</u>	<u>Anaphylaxis</u>
<ul style="list-style-type: none"> Contact dermatitis and/ or urticaria Dermal itching WITHOUT dyspnea or hypotension 	<ul style="list-style-type: none"> Urticaria Dermal itching Localized or generalized peripheral edema Shortness of breath WITHOUT hypotension 	<ul style="list-style-type: none"> Urticaria Generalized edema Shortness of breath Hypotension: BP < 100 mm Hg

ADULT

EMT

CABC's
 O₂
 V/S
 Assist patient with Epi-Pen
 repeat prn

EMT - I

IV titrate to BP > 100 systolic

PARAMEDIC

ECG

- **Diphenhydramine 25-50 mg IM or IV**
IF Wheezing/Difficulty Breathing:
 - **Epinephrine 1:1,000** 0.3 mg SQ
 may repeat once in 5 mins
 - **Methylprednisolone 125-250 mg IV**
IF patient is unconscious and hypotensive:
 - **Epinephrine 1:10,000** 0.1 mg IV over 1 min,
 or **Epinephrine 1:1,000** 0.5 mg SL injection
 Repeat previous dose of Epinephrine if
 anaphylaxis not resolved

MEDICAL CONTROL

None None

PEDI

EMT

CABC's
 O₂
 V/S
 Assist patient with Epi-Pen Jr. (.3mg)
 repeat prn

EMT - I

IV titrate to systolic BP > 70 + (age X 2)

PARAMEDIC

Broselow Tape

ECG

- **Diphenhydramine 1 mg/kg IM or IV**
 Max. single dose **25 mg**
IF Wheezing/Difficulty Breathing:
 - **Epinephrine 0.01 mg/kg 1:1,000 SQ**
 Max single dose **0.3 mg**, May repeat once
 - **Methylprednisolone 2-3 mg/kg IV**
 Max. single dose **125 mg**
IF unconscious and hypotensive:
 - **Epinephrine 1:10,000** 0.01 mg/kg IV
 over 1 min, Max dose 0.1 mg
 or **Epinephrine 1:1,000** 0.01 mg/kg SL
 injection, Max dose 0.5 mg
 Repeat previous dose of Epinephrine if
 anaphylaxis not resolved

MEDICAL CONTROL

NOTES:

O₂ should be by NRB mask or blow-by for pedi patients at 10-15 l/min in the patient with severe reaction or anaphylaxis. O₂ may be titrated to patient need in other situations.

IV must be NS titrated to a BP of at least 100 systolic or as indicated in the "[Normal Vital Signs by Age/Weight](#)" chart for pedi patients (approximately $70 + (\text{age} \times 2)$) and should be of the largest bore possible. Multiple IV's may be established on the profoundly hypotensive patient. IO access should be obtained in the anaphylactic patient in whom an IV cannot be initiated in 2 attempts or 90 seconds. IV may be deferred in the "mild" patient, at the EMS personnel's discretion.

In the obtunded or unconscious anaphylactic patient in whom IV or IO access cannot be rapidly established, 1:1,000 epinephrine 0.5 mg (0.01 mg/kg up to 0.5 mg) may be injected directly into the sublingual tissue.

ASTHMA and OBSTRUCTIVE AIRWAY DISEASE

CRITERIA:

Shortness of breath with history of asthma, COPD, chronic bronchitis, and Auscultated findings of bronchospasm (wheezes or silence) or expiratory constriction as noted by “shark fin” wave forms on the capnograph

ADULT

EMT

CABC's

O₂

V/S

- **Albuterol 2.5 mg by nebulized inhalation**

May repeat continuously to a total of four doses if dyspnea not relieved

EMT - I

IV 250 - 500 ml/hr

IF tidal volume inadequate for inhalation therapy:

CPAP at 5 cmH₂O with Albuterol 2.5 mg nebulized inline

IF patient requires intubation:

Albuterol 2.5 mg should be instilled down the ET tube

PARAMEDIC

ECG

- **Terbutaline 0.25 mg SQ**

Repeat once in 10 min if dyspnea not relieved

IF dyspnea is refractory to terbutaline:

- **Epinephrine 1:1,000 0.3 mg SQ** if patient <45 years old and no cardiac history

IF refractory asthma (multiple doses of bronchodilators are required)

- **Methylprednisolone 125 - 250 mg IV**

MEDICAL CONTROL

Epinephrine for patients > 45 years old or with history of heart disease

IF asthma refractory to above bronchodilators:

- **Magnesium Sulfate 2.0 G slow IV**

PEDI

EMT

CABC's

O₂

V/S

- **Albuterol 2.5 mg by nebulized inhalation**

May repeat continuously to a total of four doses if dyspnea not relieved

EMT - I

Broselow Tape

IV 10-15 ml/kg/hr

IF patient requires intubation:

Albuterol 2.5 mg should be instilled down the ET tube

PARAMEDIC

ECG

IF severe dyspnea:

- **Epinephrine (1:1,000) 0.01 mg/kg SQ** (max. single dose 0.3 mg), may repeat once in 5 min

- **Terbutaline 0.25 mg SQ** for children > 35 kg if dyspnea not relieved by epinephrine

IF refractory asthma (multiple doses of bronchodilators are required):

- **Methylprednisolone 2-3 mg/kg IV**

Max single dose 125 mg

MEDICAL CONTROL

None

NOTES:

Oxygen should be humidified and be provided to maintain SpO₂ of > 95% (or >90% in the COPD patient). If O₂ saturation is decreased and patient has increased work of breathing, CPAP may be used to “splint” open the airway and deliver nebulized medications to the alveoli. If CPAP is needed, continue with other means of bronchodilation in addition to the nebulized medication.

CO₂ retention and hypercarbia resulting in a respiratory acidosis are major culprits in these patients. Hypercarbia can be managed ONLY by increasing tidal volume, in our case by BVM assist. ***BVM assist should be used in the patient with marked obtundation or respiratory insufficiency (rate less than 12/min or greater than 40/min).*** If the SpO₂ remains below 95% and the ETCO₂ remains above 50 mmHg despite 100% O₂ via NRB, consider intubation.

The IV should be NS at 250-500 ml/hr or 10-15 ml/kg/hr for the pedi patient. Bronchial/alveolar dehydration (due to tachypnea) is a component of an asthma and COPD. Hydration will often allow the patient to clear mucous plugs and may result in as much relief as bronchodilation.

The treatment regimen may be thought of as *oxygenate, bronchodilate, and hydrate.*

The severely dyspneic and hypoxic patient may require intubation, probably via the nasal route or with RSI. Find out if the patient has required intubation in the past, as this is an indicator of the relative severity of their disease.

Epinephrine, even 1:1,000 SQ, will increase heart rate and therefore myocardial oxygen demand. This may be extremely detrimental to the hypoxic/tachycardic patient, especially an elderly patient. Contact OLMC for orders for epinephrine if the patient is over 45 years old or has a cardiac history.

The provider may “mix” the use of nebulized albuterol and SQ terbutaline as needed. Albuterol may be given as a continuous updraft up to four doses total. Subcutaneous terbutaline may be given up to a total of two doses. Some patients may respond to nebulized albuterol alone; others will require concomitant administration of albuterol and terbutaline; while others may not have the tidal volume to adequately gain benefit from nebulization alone and will require SQ terbutaline. The patient who has inadequate respiratory tidal volume to uptake nebulized medications must have bronchodilation medication (terbutaline and/or epinephrine) given parenterally.

If the patient requires two or more doses of bronchodilators, administer methylprednisolone. Asthmatics often have a significant inflammatory response during an asthma attack and this can be mitigated through the use a steroid.

CROUP/EPIGLOTTITIS

CRITERIA:

Dyspnea

WITH evidence of upper airway obstruction (inspiratory stridor, drooling, or hoarseness)

AND any one or more of the following:

- Fever
- Recent history of URI symptoms
- Dysphagia or severe sore throat

A
/
B

ADULT	PEDI
EMT	EMT
	CABC's O ₂ (Humidified) V/S Maintain normothermia
EMT - I	EMT - I
	IF in complete obstruction: - Surgical airway
PARAMEDIC	PARAMEDIC
	ECG Broselow Tape IF febrile and child tolerates without agitation: - APAP 15 mg/kg PO/PR
MEDICAL CONTROL	MEDICAL CONTROL
	None

NOTES:

If there is any doubt as to whether the patient is suffering from croup or epiglottitis, do everything possible to minimize the child's agitation.

Croup is usually found in children between the ages of 6 months and 4 years and preceded by an upper respiratory infection. A "barking," often spasmodic cough, and hoarseness may mark the acute onset of inspiratory stridor, commonly at night. The child often awakens during the night with respiratory distress and tachypnea. The obvious respiratory distress and the harsh inspiratory stridor are the most dramatic physical findings.

The onset of epiglottitis is frequently acute and fulminating. Sore throat, hoarseness, and high fever develop abruptly in a previously well child. Dysphagia and respiratory distress characterized by drooling, dyspnea, tachypnea, and inspiratory stridor develop rapidly and cause the child to assume a tripod position. Acute epiglottitis usually presents before 5 years of age. As long as the child has adequate respiratory volume, DO NOT place any instrument in the child's mouth since severe laryngospasm and swelling may result. Respiratory arrest can occur from total airway obstruction or a combination of partial airway obstruction and fatigue. If respiratory arrest occurs BVM with 100% oxygen should precede any attempt to intubate the patient or to perform emergency surgical airway. Always try to intubate the patient with direct laryngoscopy prior to performing a surgical airway.

FOREIGN BODY AIRWAY OBSTRUCTION

CRITERIA:

Partial or complete airway obstruction secondary to foreign body aspiration **WITH:**

- Decreased LOC, **OR**
- Cyanosis, **OR**
- Obvious inadequate air exchange

ADULT

EMT

CABC's
Abdominal/chest thrusts
Reassess airway

EMT - I

Direct laryngoscopy
Attempt to visualize object and remove with
Magill forceps
Intubate as needed
IF all interventions have failed **AND** patient
is in **complete** obstruction:
- [Surgical airway](#)

PARAMEDIC

MEDICAL CONTROL

Surgical airway for situations other than
above

PEDI

EMT

CABC's
Abdominal/chest thrusts
Reassess airway

EMT - I

Direct laryngoscopy
Attempt to visualize object and remove
with Magill forceps
Intubate as needed
IF all interventions have failed **AND**
patient is in **complete** obstruction:
- [Surgical airway](#)

PARAMEDIC

MEDICAL CONTROL

Surgical airway for situations other than
above

NOTES:

In the conscious patient, abdominal and chest thrusts are used (as per AHA BCLS guidelines).
Chest thrusts are used when abdominal thrusts are contraindicated by pregnancy or obesity.

In the unconscious patient, the EMS personnel should attempt to ventilate and intubate as with
any patient. If unable to ventilate with the BVM, go directly to direct laryngoscopy and forceps
removal of the foreign object.

If the object is visualized in the trachea, but EMS personnel are unable to remove it,
consideration may be given to using an endotracheal tube to force the object down into the right
lung so that the left lung may be ventilated. This is obviously a last resort when no ventilation is
possible and the obstruction is below the level where a surgical airway would be effective.

Surgical airway is indicated for the airway obstruction not relieved by other means.

HYPERVENTILATION

CRITERIA:

An increased rate and/or depth of respiration

- **WITHOUT** evidence of hypoxemia or hypercarbia

AND WITH one or more of the following:

- Facial or peripheral tingling
- Extremity cramping or carpopedal spasm
- Dizziness

A
/
B

ADULT

EMT

CABC's

Oxygen mask with low flow (4-6 lpm)

oxygen administration

Psychological support

V/S

EMT - I

IF transport: **IV TKO**

PARAMEDIC

ECG

Capnography

IF extreme anxiety refractory to all other interventions

- **Midazolam 0.05 mg/kg IV up to 2 mg;**
may repeat once in 5 minutes

MEDICAL CONTROL

Additional doses of **Midazolam** beyond 4 mg

PEDI

EMT

CABC's

Oxygen mask with low flow (4-6 lpm)

oxygen administration

Psychological support

V/S

EMT - I

IF transport: **IV TKO**

PARAMEDIC

ECG

Capnography

Broselow Tape

MEDICAL CONTROL

- **Midazolam 0.05 mg/kg IV up to 2 mg**

NOTES:

Rule out hypoxia/ischemia through a thorough history and exam, ETCO₂, vital-signs, ECG, and pulse oximetry, before concluding hyperventilation.

IF THERE IS ANY DOUBT as to the source of the patient's shortness of breath, **GIVE OXYGEN.**

Verbal coaching in breath-holding to increase CO₂ uptake can be substituted for an oxygen mask with low-flow O₂ (4-6 lpm), and is usually the most effective intervention. Allow the patient to see the capnograph and coach them to try to bring the numbers into the normal range.

DO NOT use objects or devices which occlude oxygen uptake, such as paper or plastic bags or NRB masks without O₂.

Transport the patient who does not show improvement in symptoms within 10 minutes of intervention or complete resolution within 20 minutes. Benzodiazepines may be utilized for *severe* cases refractory to all other interventions.

PNEUMONIA/ BRONCHIOLITIS

CRITERIA:

Dyspnea

WITH one or more of the following:

- Fever
- Productive, purulent cough
- Chest wall or pleuritic pain

ADULT

EMT

CABC's

O₂ (Humidified)

V/S

Blood Glucose Determination

IF moderate to severe dyspnea:

-Albuterol 2.5 mg by nebulized inhalation

May repeat continuously to a total of four doses if dyspnea not relieved

EMT - I

IV 250-500 ml/hr

PARAMEDIC

ECG

IF tidal volume inadequate for inhalation therapy:

-Terbutaline 0.25 mg SQ

May repeat once in 10 min if dyspnea not relieved

MEDICAL CONTROL

None

PEDI

EMT

CABC's

O₂ (Humidified)

V/S

Maintain normothermia

IF moderate to severe dyspnea:

-Albuterol 2.5 mg by nebulized inhalation

May repeat continuously to a total of four doses if dyspnea not relieved

EMT - I

Broselow Tape

IV 10-15 ml/kg/hr

PARAMEDIC

ECG

IF febrile:

- APAP 15 mg/kg PO/PR

IF severe dyspnea:

- Epinephrine 1:1,000 0.01 cc/kg SQ or Terbutaline 0.25 mg SQ for children > 35 kg

MEDICAL CONTROL

None

NOTES:

Bronchiolitis is a viral or bacterial infection of the bronchioles themselves. Pneumonia is a more general infection of the lung, including the large airways and the alveoli. Bronchiolitis generally occurs in children under 2 years of age. Pneumonia may occur at any age.

Oxygen should be humidified and be provided to maintain SpO₂ of > 95%.

IV fluid should be NS at approximately 250 – 500 ml/hr for the adult. If the patient displays any signs of dehydration, administer a 500 cc fluid bolus to resolve this. In pediatric patients, the IV infusion rate should be titrated to resolve dehydration (initial 20 cc/kg bolus for the child, 10 cc/kg for infant).

Pneumonia carries a high mortality rate, especially among the elderly. EMS personnel must recognize this as a serious patient.

Typically, an affected child has had a preceding URI, followed by rapid onset of respiratory distress with tachypnea, tachycardia, and a hacking cough. Increasing distress is evidenced by circumoral cyanosis and audible wheezing. The child often appears markedly lethargic, but fever is not always present. Dehydration may develop from vomiting and decreased oral intake.

Pneumonia, especially severe cases, is often confused with pulmonary edema by EMS personnel. Pneumonia may present with a wide variety of breath sounds on auscultation, including rales. History and associated signs/symptoms are the best tools to differentiate pneumonia from other sources of respiratory distress.

Pneumonia is characterized by:

- Gradual onset of symptoms, usually over a few days
- Recent history of upper respiratory infection symptoms, including a productive (sometimes purulent) cough
- Fever
- Chest wall pain.

Some pneumonia patients may present with wheezing. This may be a product of a reactive bronchospasm (in response to the presence of the bacteria), or (more likely) an indication of narrowing of the small airways from the physical obstruction of infectious material.

Occasionally, these patients may show some improvement with the administration of bronchodilators. Most often, however, the bronchodilators will have no appreciable effect, as these are usually not true cases of reversible bronchospasm.

PULMONARY EDEMA

CRITERIA:

Shortness of breath

- **WITH** evidence of pulmonary edema (auscultated findings, history, etc.)**AND**
- **WITH** systolic BP of greater than **100** mm Hg

ADULT EMT

CABC's
O₂
V/S

EMT - I

IV TKO
CPAP at 10 cmH₂O
IF intubation is required:
PEEP at 20 cmH₂O

PARAMEDIC

ECG
- **NTG 0.4 mg SL**
Repeat every 5 min up to **3 NTG doses**
total
- **Furosemide 0.5 - 1.0 mg/kg IV**
May repeat once in 10 minutes if
hypertension/pulmonary edema not relieved
- **Morphine Sulfate 2.0 mg IV** up to 10 mg
total (contraindicated if respiratory rate is
decreased)

MEDICAL CONTROL

None

PEDI EMT

CABC's
O₂
V/S

EMT - I

IV TKO
Broselow Tape
IF intubation is required:
PEEP at 10 cmH₂O

PARAMEDIC

ECG

MEDICAL CONTROL

- **NTG 0.4 mg SL** for children > 40 kg
- **Furosemide 0.5 - 1.0 mg/kg IV**
Max. single dose of 40 mg
- **Morphine Sulfate 0.1 - 0.2 mg/kg IV** if
respiratory rate not depressed
In increments of 0.05 mg/kg (max. single
dose of 2 mg)

NOTES:

Pulmonary edema often presents as simply dyspnea with wheezes or silence on auscultation: rales may not be heard. Use other signs and history to differentiate CHF from other etiologies. It is important to differentiate pulmonary edema from other sources of dyspnea, especially asthma, COPD, pneumonia, and sepsis. The use of vasodilators and diuretics on patients with these other illnesses is associated with a marked increase in morbidity and mortality. Pediatric patients presenting with true cardiogenic pulmonary edema will almost universally have a history of congenital cardiac problems.

Pulmonary edema is usually associated with these indicators:

- Atrial fibrillation (due to atrial dilation)
- Sudden onset, frequently at night
- Hypertension
- Previous cardiac history
- Home medications such as lanoxin (or digoxin) and furosemide

Hypotensive patients (systolic BP of less than 100 mm Hg) with pulmonary edema are actually in cardiogenic shock, and should be treated with the [Cardiogenic Shock](#) protocol.

Oxygen should be by NRB at 10-15 l/min or by BVM. If O₂ saturation is decreased and the patient has increased work of breathing, CPAP may be used. If the patient needs to be intubated, PEEP should be used to help decrease the intra-alveolar edema. The severely dyspneic and hypoxic patient will benefit from early intubation. Nasal intubation is the route most likely to be successful with the older pediatric patient. Use PEEP in the intubated patient to help reduce the pulmonary edema.

IV access shall be NS at TKO rate or NS lock. Watch volume administration closely as not to worsen pulmonary edema.

Long term furosemide use often results in tolerance to its effects. If the patient is already on furosemide, administer an initial dose of 1.0 mg/kg IV. If the patient is not on furosemide, give 0.5 mg/kg IV.

V/S must be reassessed prior to each administration of a vasodilator. Should the patient's systolic BP fall below the threshold given by MC, the vasodilator must be withheld until the BP rises above the threshold, or MC authorizes additional vasodilators

RESPIRATORY DISTRESS - GENERAL

CRITERIA:

Dyspnea WITHOUT clear etiology

ADULT	PEDI
EMT	EMT
CABC's O ₂ V/S Blood Glucose Determination -Albuterol 2.5 mg by nebulized inhalation May repeat continuously to a total of four doses if dyspnea not relieved	CABC's O ₂ V/S Blood Glucose Determination -Albuterol 2.5 mg by nebulized inhalation May repeat continuously to a total of four doses if dyspnea not relieved
EMT - I	EMT - I
IV	IV
PARAMEDIC	PARAMEDIC
ECG IF tidal volume inadequate for inhalation therapy: - Terbutaline 0.25 mg SQ May repeat once in 10 minutes if dyspnea not relieved MOVE to more specific protocol, if possible	Broselow Tape ECG IF inadequate tidal volume for inhalation therapy or refractory to albuterol: - Terbutaline 0.25 mg SQ if patient > 35 kg IF terbutaline contraindicated or dyspnea refractory to terbutaline: -Epinephrine (1:1,000) 0.01 mg/kg SQ (max. single dose 0.3 mg) May repeat once in 10 minutes if dyspnea not relieved MOVE to more specific protocol, if possible
MEDICAL CONTROL	MEDICAL CONTROL
None	None

NOTES:

Oxygen should be provided to maintain SpO₂ of > 95%.

As soon as possible, move to a more specific protocol. Consider these differentials:

- [Foreign Body Airway Obstruction](#) - sudden onset; stridor or snoring.
- [Asthma](#) - relatively rapid onset; wheezing or silence; history of asthma.
- [COPD](#) - gradual onset; history of COPD or long-term cigarette use.
- [Pneumonia](#) - gradual onset; recent history of URI; fever; chest wall pain.
- [Pulmonary Edema](#) - sudden onset; history of cardiac, renal, or hypertension problems; presents with hypertension and/or A-fib.
- [Pulmonary Embolus](#) - sudden onset; chest or back pain; history of recent surgery, recent childbirth, long-term immobility, or A-fib.
- [Allergic Reaction](#) - sudden onset; urticaria, itching, and/or edema; history of allergies.
- [Hyperventilation](#) - recent history of anxiety/emotional upset; facial tingling and/or carpo-pedal spasms; otherwise clinically benign.

CARDIAC ARREST – EMT and EMT-I PROVIDERS

CRITERIA: Pulseless/apneic or pulseless with agonal respirations, from any cause.

ADULT

EMT

CABC's, immediately start CPR (30:2)
Ventilate w/ BVM and OPA
Apply AED
IF witnessed arrest:
 Analyze rhythm/Defibrillate if indicated
IF unwitnessed arrest:
 CPR for 2 mins (5 cycles)
 Analyze rhythm/Defibrillate if indicated
Resume CPR immediately after shock is delivered
IF traumatic arrest: TRANSPORT NOW
-Check for pulse and Analyze rhythm after 2 mins (5 cycles of CPR)
-Defibrillate if indicated
-Resume CPR immediately after shock is delivered
Repeat above 3 steps until EMT-P provider arrives or patient is delivered to E.D.
When possible:
Esophageal Airway
Ventilate 8-10/min in sync w/ compressions

EMT - I

IV
Intubation
Ventilate 8-10/min in sync w/ compressions

MEDICAL CONTROL

None

PEDI

EMT

CABC's, immediately start CPR (15:2)
Ventilate w/ BVM and OPA
Apply AED – use pedi setting if available
IF witnessed arrest:
 Analyze rhythm/Defibrillate if indicated
IF unwitnessed arrest:
 CPR for 2 mins (5 cycles)
 Analyze rhythm/Defibrillate if indicated
Resume CPR immediately after shock is delivered
IF traumatic arrest: TRANSPORT NOW
-Check for pulse and Analyze rhythm after 2 mins (10 cycles of CPR)
-Defibrillate if indicated
-Resume CPR immediately after shock is delivered
Repeat above 3 steps until EMT-P provider arrives or patient is delivered to E.D.

EMT - I

IV
Intubation
Ventilate 8-10/min in sync w/ compression

MEDICAL CONTROL

None

NOTES:

Adult: 30 compressions/2 ventilations (BVM) until advanced airway is placed
Pedi: 15 compressions/2 ventilations (2 rescuer); 30:2 (single rescuer)
Chest compressions must be of adequate rate (≥ 100 /min) and depth (≥ 2 inches – adult; 1 ½ to 2 inches - pedi). Allow complete chest recoil after each compression, minimize interruptions in chest compressions (interruptions should be no more than 10 sec; continue compressions while the AED is charging). Avoid excessive ventilation. To provide the best quality CPR without interruptions, you should work the patient on the scene (in the house or wherever you find them, provided the scene is secure), NOT immediately move them to the ambulance.

After an esophageal airway or ET tube is placed, ventilate 8-10 times per minute without stopping compressions.

IV should be run at TKO unless hypovolemia is suspected.

CARDIAC ARREST, ADULT – PARAMEDIC PROVIDERS

CRITERIA: Pulseless/apneic or pulseless with agonal respirations, from any cause.

ADULT

PARAMEDIC

CABC's, immediately start CPR (30:2)

Ventilate w/ BVM and OPA

ECG

IF witnessed arrest:

Defibrillate if VF/VT (**Adult Dose, or 360 J monophasic**)

Precordial Thump if Defibrillator not immediately available

IF unwitnessed arrest:

CPR for 2 mins (5 cycles)

Check rhythm

Defibrillate if VF/VT (**Adult Dose, or 360 J monophasic**)

Resume CPR immediately after shock is delivered

-Check for pulse and Analyze rhythm after 2 mins (5 cycles of CPR)

-Defibrillate if indicated (**Adult Dose, or 360 J monophasic**)

-Resume CPR immediately after shock is delivered

Repeat above 3 steps until ROSC, patient is delivered to E.D., or resuscitation is terminated

IF arrest is due to trauma: TRANSPORT NOW

When possible:

IV

Intubation/Esophageal Airway - Ventilate 8-10/min in sync w/ compressions

NG tube

IF patient is hypothermic (rectal temp < 85°F): Continue CPR, contact OLMC for further orders

IF ECG rhythm is Asystole/PEA:

- **Epinephrine (1:10,000) 1 mg IV** (2 mg 1:1,000 ET)

Repeat q 3-5 min

IF ECG rhythm is VF/VT:

- **Epinephrine (1:10,000) 1 mg IV** (2 mg 1:1,000 ET)

Repeat q 3-5 min

- **Amiodarone 300 mg IV**

Repeat dose of 150 mg after 5 min if no change

IF ECG is Torsades de Pointes:

- **Magnesium Sulfate 2 G IV** may be used instead of amiodarone

IF Hyperkalemia or Acidosis suspected (dialysis patient, TCA overdose, DKA):

- **Sodium Bicarbonate 1 mEq/kg IV**

MEDICAL CONTROL

Drug therapy for hypothermic patients

CARDIAC ARREST, PEDIATRIC – PARAMEDIC PROVIDERS

CRITERIA: Pulseless/apneic or pulseless with agonal respirations, from any cause.

PEDI

PARAMEDIC

CABC's, immediately start CPR (15:2)

Ventilate w/ BVM and OPA

ECG

IF VF/VT: Defibrillate (2 J/kg)

Resume CPR immediately after shock is delivered

-Check for pulse and Analyze rhythm after 2 mins (10 cycles of CPR)

-Defibrillate if indicated (4 J/kg)

-Resume CPR immediately after shock is delivered

Repeat above 3 steps until ROSC or patient is delivered to E.D.

IF arrest is due to trauma: TRANSPORT NOW

When possible:

Broselow Tape (also see [Pediatric and Neonatal Resuscitation Chart](#))

IV

Intubation - Ventilate 8-10/min in sync w/ compressions

NG tube

IF patient is hypothermic (rectal temp < 85°F): Continue CPR, contact OLMC for further orders

IF ECG is Asystole/PEA:

- **Epinephrine (1:10,000) 0.01 mg/kg IV** (0.02 mg/kg ET)

Repeat q 3-5 min

IF ECG is VF/VT:

- **Epinephrine (1:10,000) 0.01 mg/kg IV** (0.02 mg/kg ET)

Repeat q 3-5 min

- **Amiodarone 5 mg/kg IV**, max dose 300 mg

Repeat dose of 5 mg/kg after 5 min if no change

Second dose max 150 mg

IF ECG is Torsades de Pointes:

- **Magnesium Sulfate 25 mg/kg IV** may be used instead of amiodarone, max dose 2 G

IF Hyperkalemia or Acidosis suspected (dialysis patient, TCA overdose, DKA):

- **Sodium Bicarbonate 1 mEq/kg IV**

MEDICAL CONTROL

Drug therapy for hypothermic patients

NOTES:

Adult: 30 compressions/2 ventilations (BVM) until advanced airway is placed

Pedi: 15 compressions/2 ventilations (2 rescuer); 30:2 (single rescuer)

Chest compressions must be of adequate rate ($\geq 100/\text{min}$) and depth (≥ 2 inches – adult; $1\frac{1}{2}$ to 2 inches - pedi). Allow complete chest recoil after each compression, minimize interruptions in chest compressions (interruptions should be no more than 10 sec; continue compressions while the AED is charging). Avoid excessive ventilation. To provide the best quality CPR without interruptions, you should work the patient on the scene (in the house or wherever you find them, provided the scene is secure), NOT immediately move them to the ambulance.

Monophasic defibrillations should be administered at 360 J for all shocks. Biphasic machines should follow the manufacturer's protocol for energy delivery; typical values are listed below:

Adult Defibrillation Energy Protocol	1 st Defibrillation	2 nd Defibrillation	3 rd and subsequent defibrillations
Monophasic (all brands)	360 J	360 J	360 J
Medtronic biphasic	200 J	300 J	360 J
Phillips biphasic	150 J	150 J	150 J
Zoll biphasic	120 J	150 J	200 J

As ET medications are generally not as effective as those given IV, IV or IO access should be given a higher priority than intubation. **Epinephrine (1:1,000) 2mg** should be diluted with NS to a total volume of 8 - 10 cc prior to administration via the ET tube.

IV should be run at TKO unless hypovolemia is suspected. Administer a 250-500 ml fluid bolus if hypovolemia is suspected (typically a rapid PEA). Deliver a bolus of ~ 20 ml after each medication is administered.

After an esophageal airway or ET tube is placed, ventilate 8-10 times per minute without stopping compressions.

Capnography must be monitored on all patients in cardiac arrest. A sudden increase in ETCO_2 may indicate ROSC and providers should check for a pulse when this is observed. An ETCO_2 value that persistently remains below 10mmHg indicates the patient is not responding to the resuscitative efforts and termination of the resuscitation may be considered.

NG intubation should be used to decompress the stomach in all CPR patients, as gastric insufflation will inhibit effective ventilations and may exacerbate brady-asystolic dysrhythmias.

Sodium Bicarbonate should be used only if metabolic acidosis or hyperkalemia is likely. Acidosis should be managed primarily with ventilation. Situations calling for administration of Sodium Bicarbonate would be TCA overdoses, renal failure patients, or known acidosis. Use caution when administering Sodium Bicarbonate as it will cause precipitate to form if administered with other medications. Flush IV tubing before and after administration.

Much controversy exists as to the role of ALS procedures in the profoundly hypothermic patient. Provide CPR, IV access, and an advanced airway if possible. The hypothermic patient should be defibrillated one time, but consult OLMC for orders regarding further defibrillations and any medication administration.

Should the patient develop ROSC, use the Post-Resuscitation Management protocol.

POST-RESUSCITATION MANAGEMENT

CRITERIA:

Patient with spontaneous circulation after being treated for any non-perfusing rhythm

ADULT	PEDI
EMT	EMT
Reassess: CABC's O ₂ V/S Transport to STEMI/Post ROSC facility	Reassess: CABC's O ₂ V/S Transport to STEMI/Post ROSC facility
EMT - I	EMT - I
IV	IV
PARAMEDIC	PARAMEDIC
Obtain 12 Lead ECG	Obtain 12 Lead ECG
IF patient converted with defibrillation from a ventricular rhythm AND the ECG shows continued signs of ventricular dysrhythmias (runs of VT, PVC's >6/min) AND NOT bradycardic: IF patient received no prior dose of amiodarone: - Amiodarone 150 mg IV infused over 10 minutes IF patient DID receive amiodarone: - Amiodarone 1 mg/min IV drip IF patient received Mag Sulfate: Magnesium Sulfate drip 0.5-1.0 G/hr	IF patient received no prior dose of amiodarone: - Amiodarone 5 mg/kg IV infused over 10 minutes IF patient DID receive amiodarone: - Amiodarone 0.5 mg/min IV drip IF patient received Mag Sulfate: Magnesium Sulfate drip 0.5-1.0 G/hr
IF Persistent Symptomatic Bradycardia after resuscitation: Use Bradycardia protocol	IF Persistent Symptomatic Bradycardia after resuscitation: Use Bradycardia protocol
NG tube	NG tube
IF still hypotensive 5 min after conversion from any rhythm, EXCEPT a hemorrhagic PEA (which becomes perfusing after a fluid bolus): - Dopamine infusion 5-20 mcg/kg/min	IF still hypotensive 5 min after conversion from any rhythm, EXCEPT a hemorrhagic PEA (which becomes perfusing after a fluid bolus): - Dopamine infusion 5-20 mcg/kg/min
MEDICAL CONTROL	MEDICAL CONTROL
None	None

NOTES:

Oxygen should be provided to maintain SpO₂ of > 95%.

If IV is not already established, it must be NS at TKO (or wide open if patient is hypovolemic). IV site must be no more peripheral than the AC. Catheter must be largest bore possible.

Be cognizant of the risk of pulmonary edema and manage your fluid delivery rates accordingly. A fluid challenge may be beneficial to some patients in cardiogenic shock.

Antiarrhythmics should be withheld in the post-resuscitation patient unless signs of continued arrhythmias are present. This would include runs of VT, PVC's >6/min, or other evidence of ventricular irritability. Also, antiarrhythmic medications should be withheld in the patient found in a bradycardia or high-grade AV block rhythm (2nd degree or 3rd degree) regardless of the previous use of electricity, or amiodarone. Once such a patient converts from a bradycardic or AV block rhythm, antiarrhythmics may be given for recurrent ventricular dysrhythmias.

Amiodarone is administered 150 mg over 10 minutes. Inject 150 mg in a 100 ml bag of NS, and infuse at 100 gtt/min (10 gtt/ml set). The maintenance infusion of amiodarone is infused at 1 mg/minute. Inject 100 mg in 100 cc bag of NS and infuse at 60 gtt/min (minidrip set).

If the patient was in Torsades de Pointes and converted with Magnesium Sulfate, begin a Magnesium Sulfate infusion of 0.5-1.0 G/hr (4-8 mEq/min). Inject 2 G in 100 cc of NS and run at 25 to 50 gtt/min (minidrip set).

Patients frequently display profound bradycardias, AV blocks, and hypotension in the first few minutes following resuscitation. It is rarely necessary to intervene in these transient states. Ensure adequacy of the ABC's and provide supportive care. Treat rhythms and hypotension which persist to 5 minutes post resuscitation.

Vasopressors (dopamine) **MUST NOT** be used to treat hypotension secondary to hypovolemia. If a patient's rhythm becomes perfusing after administration of IV fluid, the paramedic should continue to treat the hypotension with fluid rather than dopamine.

NG intubation should be used to decompress the stomach in all CPR patients, as gastric insufflation will inhibit effective ventilations and may exacerbate brady-asystolic dysrhythmias by pressing directly on the vagus nerve.

FIELD TERMINATION OF RESUSCITATION

CRITERIA:

Adult, normothermic, non-traumatic cardiac arrest patients, **WITH** a minimum of 20 minutes of resuscitative efforts (time starts with initiation of CPR) without ROSC, no bystander CPR, and no shocks delivered.

This protocol does not apply to pediatric patients.

Additionally, the patient will be transported if the family requests transport, the patient is in a public area, the death does not appear to be of natural causes, or the patient is pregnant.

ADULT

EMT

EMT - I

Resuscitative efforts as noted in [CARDIAC ARREST – EMT and EMT-I PROVIDERS](#)

Bystander CPR was not provided

20 minutes of CPR with no ROSC

AED – No shocks delivered

IF Paramedic level providers are not on scene after 20 minutes, contact OLMC as below

PARAMEDIC

Resuscitative efforts as noted in [CARDIAC ARREST, ADULT – PARAMEDIC PROVIDERS](#)

Bystander CPR was not provided

Successful completion of:

Advanced Airway, IV, ACLS medication administration

No defibrillations administered

No reversible causes of cardiac arrest are found (Hypothermia, drug overdose, suspected electrolyte imbalance, CNS depressant toxin, etc.)

No return of spontaneous circulation after 20 minutes of resuscitation efforts

MEDICAL CONTROL

Contact OLMC for orders to terminate resuscitation efforts and pronounce the patient dead on scene. Include time of pronouncement and name of Medical Control physician on documentation.

Release scene/body to law enforcement or other agency in accordance with local operational procedures.

NOTES:

Leave all medical devices (airway, IV lines, etc.) in place once resuscitation is terminated.

CARDIAC ARRHYTHMIA – UNSTABLE TACHYCARDIA

CRITERIA:

Tachycardia on ECG, regardless of QRS duration,

WITH hypotension (Adult = systolic BP < 90 mm Hg; Pedi = systolic BP < 70 + (2 X age)),

OR Pulmonary edema, **OR** Significant altered mentation

ADULT EMT	PEDI EMT
Rate > 150 CABC's O ₂ V/S	Rate > 180 CABC's O ₂ V/S
EMT - I	EMT - I
IV	IV
PARAMEDIC	PARAMEDIC
ECG (if possible, 12 Lead ECG) - Midazolam 0.05 - 0.1 mg/kg IV/IN (if patient's mental status requires sedation for cardioversion) - Synchronized cardioversion at: 100 J, 200 J, 300 J, 360 J monophasic, or at biphasic equivalent	ECG (if possible, 12 Lead ECG) Broselow Tape - Midazolam 0.05 - 0.1 mg/kg IV/IN max dose 5 mg (if patient's mental status requires sedation for cardioversion) - Synchronized cardioversion at: 1 J/kg, 2 J/kg
IF tachycardia refractory to cardioversion: - Amiodarone 150 mg IV infused over 10 minutes	
IF tachycardia resolved by Amiodarone: - Amiodarone drip 1 mg/min	
MEDICAL CONTROL	MEDICAL CONTROL
Additional synchronized cardioversion at 360 J	Additional synchronized cardioversions at 2 J/kg
- Magnesium Sulfate 2.0 G slow IV	- Amiodarone 5 mg/kg IV max dose 150 mg infused over 10 minutes

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CARDIAC ARRHYTHMIA – WIDE COMPLEX TACHYCARDIA

CRITERIA:

Tachycardia on ECG with QRS duration ≥ 0.12 sec (Pedi ≥ 0.9 sec)

WITHOUT hypotension **OR** Pulmonary edema, **OR** Significant altered mentation

ADULT EMT	PEDI EMT
Rate > 150 CABC's O ₂ V/S	Rate > 180 CABC's O ₂ V/S
EMT - I	EMT - I
IV	IV
PARAMEDIC	PARAMEDIC
12 Lead ECG	12 Lead ECG
<p>IF V-Tach or undetermined rhythm: - Amiodarone 150 mg IV infused over 10 minutes IF resolved by Amiodarone: - Amiodarone drip 1 mg/min</p>	Broselow Tape
<p>IF regular, monomorphic rhythm: - Adenosine 6 mg IV Repeated as 12 mg IV twice at 2 min intervals</p>	
<p>IF polymorphic V-Tach (torsades de pointes): - Magnesium Sulfate 2.0 G slow IV</p>	
MEDICAL CONTROL	MEDICAL CONTROL
<p>- Midazolam 0.05 - 0.1 mg/kg IV (if NO respiratory depression) for cardioversion - Synchronized cardioversion as in UNSTABLE TACHYCARDIA</p>	<p>IF V-tach or undetermined rhythm - Amiodarone 5 mg/kg IV/IO, max dose 150 mg IF regular, monomorphic rhythm: - Adenosine 0.1 mg/kg IV max dose 6 mg Repeated as 0.2 mg/kg IV max dose 12 mg in 2 minutes, and again in 4 minutes if tachyarrhythmia persists</p>
	<p>- Lorazepam 0.1 mg/kg IV (if if NO respiratory depression) up to 2 mg max dose - Synchronized cardioversion as in UNSTABLE TACHYCARDIA</p>

CARDIAC ARRHYTHMIA – NARROW COMPLEX TACHYCARDIA

CRITERIA:

Tachycardia on ECG with QRS duration < 0.12 sec (Pedi < 0.9 sec)

WITHOUT hypotension **OR** Pulmonary edema, **OR** Significant altered mentation

ADULT	PEDI
EMT	EMT
Rate > 150 CABC's O ₂ V/S	Rate > 180 CABC's O ₂ V/S
EMT - I	EMT - I
IV	IV
PARAMEDIC	PARAMEDIC
12 Lead ECG - Vagal maneuvers - Adenosine 6 mg IV May repeat twice every 2 minutes if no conversion as 12 mg IV	12 Lead ECG Broselow Tape - Vagal maneuvers - Adenosine 0.1 mg/kg IV max dose 6 mg May repeat twice every 2 minutes if no conversion as 0.2 mg/kg IV max dose 12 mg
IF rhythm is A-fib or A-flutter: - Diltiazem 0.25 mg/kg IV over 2 minutes, max dose 20 mg Repeated as 0.35 mg/kg IV once in 15 minutes if no conversion, max dose 25 mg	
IF rhythm refractory to above treatments: - Amiodarone 150 mg IV infused over 10 minutes	
MEDICAL CONTROL	MEDICAL CONTROL
- Midazolam 0.05 - 0.1 mg/kg IV (if NO respiratory depression) for cardioversion - Synchronized cardioversion as in UNSTABLE TACHYCARDIA	- Lorazepam 0.1 mg/kg IV (if if NO respiratory depression) up to 2 mg max dose - Synchronized cardioversion as in UNSTABLE TACHYCARDIA

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NOTES:

Tachycardias will be categorized as Unstable, Wide Complex, or Narrow Complex. Any patient that is unstable, regardless of QRS duration, will be treated with the Unstable protocol. For our purposes, the tachycardic patient is unstable if they have:

- Hypotension (Adult = systolic BP < 90 mm Hg; Pedi = systolic BP < 70 + (2 X age))
- Pulmonary Edema
- Altered Mental Status, most likely resultant from the tachycardia

If the patient becomes unstable during treatment, move to the [UNSTABLE TACHYCARDIA](#) protocol.

Oxygen should be provided to maintain SpO₂ of > 95%.

Always obtain a 12 lead ECG on the stable patient prior to beginning therapy. Differentiate what the presenting rhythm is, and use the most appropriate medication for the patients condition. If unable to discern what the rhythm is, treat for VT. If it can be done expeditiously, obtain a 12 lead ECG on the unstable patient prior to cardioversion. However, do not delay cardioversion in the unstable patient to obtain a 12 lead.

Vagal maneuvers include carotid sinus massage and Valsalva's maneuver. See [Vagal Maneuvers](#) procedure. Vagal maneuvers should not be attempted in children less than 4 years of age. Valsalva's maneuver may be attempted three times prior to MC contact, carotid sinus massage may be attempted twice.

If adenosine is going to be administered, also establish an injection lock at a site no more peripheral than the AC. Adenosine must be given as directly into the central circulation as possible. See [Adenosine Administration](#) procedure. Adenosine may be used for monomorphic, regular, wide complex tachycardias. If the underlying rhythm is SVT with an aberrancy, adenosine will convert it. If the rhythm is VT, there will be no effect. Do not use adenosine if the rhythm is irregular or polymorphic.

Amiodarone should be administered as an infusion over 10 minutes. Add 150 mg amiodarone to a 100 cc bag and infuse at 100 gtt/min (10 gtt/cc set).

Magnesium sulfate should be used if the rhythm is thought to be torsades de pointes (polymorphic ventricular tachycardia). If used, magnesium sulfate in this setting should be administered as 2 G (4 ml of solution) diluted with 6 ml of IV fluid (to yield a total volume of 10 ml) given over 1 - 2 minutes slow IV push.

CARDIAC ARRHYTHMIA - BRADYCARDIA

CRITERIA:

Any underlying cardiac rhythm with a ventricular rate of < 60/min (< 80/min in an infant) or pulse rate of < 60/min

WITH evidence of poor perfusion caused by the bradycardia such as altered mental status, ongoing chest pain, hypotension or shock

ADULT	PEDI
<p style="text-align: center;">EMT</p> <p>CABC's O₂ V/S</p>	<p style="text-align: center;">EMT</p> <p>CABC's O₂ via BVM V/S IF HR < 60: - Chest Compressions</p>
<p style="text-align: center;">EMT - I</p> <p>IV</p>	<p style="text-align: center;">EMT - I</p> <p>IV Consider intubation if HR remains < 60</p>
<p style="text-align: center;">PARAMEDIC</p> <p>ECG - Atropine 0.5 mg IV <i>unless</i> 2° Type II-Fixed or 3°-Complete AV Block is present Repeat every 3-5 minutes, 3 mg total IF 2° Type II or Complete (3°) AV Block is present, go directly to Pacing or Dopamine - TCP as soon as possible - Midazolam 0.05 - 0.1 mg/kg IV for anxiety/pain if external pacing - Dopamine 5 - 20 mcg/kg/min IV for bradycardia or cardiogenic hypotension refractory to atropine and/or pacing</p>	<p style="text-align: center;">PARAMEDIC</p> <p>ECG Broselow Tape - Epinephrine (1:10,000) 0.01 mg/kg IV/IO Repeat every 3-5 minutes - Atropine 0.02 mg/kg IV/IO/ET if refractory to epinephrine Min. dose 0.1 mg/Max. dose 0.5 mg Max. total 2 mg Repeat every 3 - 5 minutes - TCP if bradycardia refractory to epinephrine and atropine - Midazolam 0.05 - 0.1 mg/kg IV up to 2 mg for anxiety/pain if external pacing</p>
<p style="text-align: center;">MEDICAL CONTROL</p> <p>None</p>	<p style="text-align: center;">MEDICAL CONTROL</p> <p>- Epinephrine infusion 0.1 - 1.0 mcg/kg/min if refractory to epinephrine, atropine and pacing - Dopamine 5 - 20 mcg/kg/min IV if refractory to epinephrine infusion</p>

NOTES:

Bradycardia in the pediatric patient is a grave sign requiring *immediate* intervention and is almost always a product of airway or respiratory compromise. It generally indicates imminent cardiac arrest. Treat it **first and foremost with aggressive oxygenation and ventilation.**

ATROPINE IS GENERALLY NOT USED in the infant of 6 months or less. Atropine has very little impact on most patients less than 4 years old.

ATROPINE SHOULD BE WITHHELD in the *normotensive* (systolic BP greater than 90) adult patient with evidence of acute ischemia (chest pain, ECG changes). Bradycardia often represents a protective mechanism in these patients to minimize myocardial oxygen demand. Consult with Medical Control prior to administering atropine in this situation.

ATROPINE is not indicated for Complete (3°) or 2° Fixed (2° Type II) AV Block. Symptomatic patients with these rhythms should be treated with an external pacemaker or with dopamine IV infusion.

When using TCP, if electrical capture is achieved, but mechanical capture is not present, the pacer *rate* may be adjusted upward incrementally to 120 bpm. The energy delivered (mA) does not require additional adjustments once electrical capture is achieved. For more info, see "[External Pacing](#)" procedure.

Dopamine should be used for the patient whose hypotension remains refractory to atropine and pacing.

Epinephrine infusion is made by adding 1 mg epinephrine 1:1,000 (1 ampule) to a 100 ml bag of NS. The drip is run as per the below table and doubled every 3 - 5 minutes until the desired effect is reached. To calculate drip, multiply the "factor" for the desired dose by the child's weight in kg. This will give the number of drops per minute at which to run the IV.

Factor X Weight (kg) = gtts/min.

Desired Dose (mcg/kg/min):	Factor
0.1	0.6
0.2	1.2
0.3	1.8
0.4	2.4
0.5	3.0
0.6	3.6
0.7	4.2
0.8	4.8
0.9	5.4
1.0	6.0

Re-evaluate patient's BP and perfusion status prior to each dose of epinephrine. Stop epinephrine administration once the heart rate is 80 or better AND the signs and symptoms listed in "CRITERIA" are abolished.

CARDIAC ISCHEMIA

CRITERIA:

Patient with chest/back/shoulder/neck/jaw or other discomfort indicative of MI
Associated symptoms indicating myocardial ischemia (i.e. SOB, nausea, diaphoresis, etc.)
ECG evidence of MI (STEMI)

ADULT EMT	PEDI EMT
CABC's O ₂ V/S - ASA 162 mg PO IF patient has been prescribed NTG AND has not taken erectile dysfunction meds in the past 24 hrs: - NTG 0.4 mg SL Transport to "AMI" hospital	CABC's O ₂ V/S
EMT - I	EMT - I
IV Establish additional saline lock if possible	IV
PARAMEDIC	PARAMEDIC
<u>12 LEAD ECG</u> IF pt has not taken erectile dysfunction meds in the past 24 hrs: - NTG 0.4 mg SL May repeat every 5 min up to 3 NTG doses total - Promethazine 6.25 - 12.5 mg IV for nausea/vomiting May repeat in 15 minutes if no relief - Morphine Sulfate 2.0 - 10.0 mg IV for continued ischemia symptoms	<u>12 LEAD ECG</u> Broselow Tape
MEDICAL CONTROL NTG or morphine sulfate for patients with systolic less than 100 mm Hg or who have taken erectile dysfunction meds within 24 hrs.	MEDICAL CONTROL - Ondansetron 0.1 mg/kg IV for severe nausea. Max dose of 4 mg, administered over 30 seconds - NTG 0.4 mg SL for children > 40 kg - Morphine Sulfate 0.1 - 0.2 mg/kg IV In increments of 0.05 mg/kg (max. single dose of 2.0 mg)

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NOTES:

Oxygen delivery should be titrated to a SpO₂ of 95% or greater.

Aspirin 162 mg PO should be administered as soon as is practical. The ASA should be given even if the patient is already on anticoagulation therapy or if they routinely take ASA. If the patient has a gastric ulcer, instruct the patient to chew the pills thoroughly, and provide a small quantity of water to limit gastric irritation.

A 12 lead ECG should be obtained before administering NTG to document the baseline infarction/injury/ischemia pattern, or to rule out a right ventricular MI. RVMI patients may not tolerate a decrease in preload secondary to the NTG, and become hypotensive. This situation should be treated with aggressive IV fluid infusion to resume normotension. If the patient fails to respond, contact Medical Control.

ECG changes consistent with myocardial infarction, injury, or ischemia:

ST segment elevation of 1 mm or more in 2 contiguous leads; T-wave inversion; or, Pathological Q waves (>1 mm wide, or ≥ 4 mm deep).

- Anterior: V₁ - V₄
- Inferior: II, III, aVF
- Lateral: I, aVL, V₅, V₆
- Posterior: ST depression of precordial leads V₁ - V₄ and abnormal R wave progression (prominent R wave in V₁ and V₂)
- New bundle branch block
- Right ventricular MI: ST elevation of 1 mm or more in 2 inferior leads (II, III and aVF) and ST elevation in V_{4R}.

Ask patients about use of medication to treat erectile dysfunction (Viagra, Cialis, etc.) prior to administering NTG. Patients who have used these medications within the past 24 hours should not receive NTG without consulting a Medical Control physician.

So long as the patient is having symptoms, he/she is having ischemia. TREAT ISCHEMIA SYMPTOMS UNTIL one of these end-points is reached:

- Systolic BP drops below threshold given by MC
- Patient reports **complete** relief of symptoms
- NTG and MS maximum doses are reached.

Assess the pain on a scale of 1 - 10 where 1 = no pain and 10 = worst pain ever. Reassess after each intervention.

V/S must be repeated before each vasodilator is given. BP must remain above 100 mm Hg systolic in order to administer each dose of vasodilator, unless Medical Control specifies otherwise.

Primary cardiac disease is very rare, but not unheard of, in pediatrics. Obtain history of past cardiac events, particularly congenital heart defects. Evaluate closely for some other etiology for the "cardiac" symptoms, contact OLMC for guidance and transport to Pedi Critical Care hospital.

CARDIOGENIC SHOCK

CRITERIA:

Hypotension **WITH** evidence of MI (pain, ECG changes, pulmonary edema, etc.)
WITHOUT evidence of hypovolemia, dehydration, sepsis, or other non-cardiogenic source of hypotension **AND WITHOUT** bradycardia

ADULT	PEDI
EMT	EMT
CABC's O ₂ V/S	CABC's O ₂ V/S
EMT - I	EMT - I
IV	IV
PARAMEDIC	PARAMEDIC
ECG IF systolic BP < 90 mm Hg: - Dopamine infusion 5 - 20 mcg/kg/min	ECG Broselow Tape
Fluid challenge if cardiogenic source questionable	
MEDICAL CONTROL	MEDICAL CONTROL
None	IV Fluid bolus 20 mg/kg - Epinephrine infusion 0.1 - 1.0 mcg/kg/min - Dopamine infusion 5 - 20 mcg/kg/min if refractory to epinephrine infusion

NOTES:

Oxygen must be by NRB at 10-15 l/min or 100% by BVM assist. If pulmonary edema is present, consider using the PEEP valve on the BVM (Paramedic level providers).

If patient is bradycardic or post-CPR resuscitation, use the [bradycardia](#) or [post-resuscitation management](#) protocol.

Dopamine is the drug of choice for *non-hypovolemic* patients with hypotension if the systolic is below 90 mm Hg.

Run the IV at TKO unless there is some reasonable doubt as to the source of the hypotension. Cardiogenic shock patients may not tolerate volume well.

See how to set up an [Epinephrine Infusion](#) for Pediatrics.

PULMONARY EMBOLUS

CRITERIA:

Sudden onset of SOB with non-cardiogenic chest pain

Mechanism for pulmonary embolus, including any one of the following:

Recent surgery, History of atrial fibrillation or CHF, Bed confinement, History of thrombophlebitis, Female patients who are on oral contraceptives (especially if smoker)

ADULT	PEDI
EMT	EMT
CABC's	CABC's
O ₂	O ₂
V/S	V/S
TRANSPORT NOW	TRANSPORT NOW
EMT - I	EMT - I
IV	IV
PARAMEDIC	PARAMEDIC
ECG	ECG
MEDICAL CONTROL	MEDICAL CONTROL
Dopamine 5 - 20 mcg/kg/min IV for persistent hypotension	Dopamine 5 - 20 mcg/kg/min IV for persistent hypotension

NOTES:

Pulmonary embolus is a *surgical* emergency sometimes requiring thoracotomy, pulmonary lobectomy, and extracorporeal bypass oxygenation. Therefore, **EARLY TRANSPORT TO AN EMERGENCY SURGICAL FACILITY** is a crucial component of the pre-hospital care.

If at all possible, intubate the patient. In moderately to severely dyspneic patients provide ventilatory assistance and O₂ by BVM. In the mild to moderately dyspneic patient, use NRB at 10-15 l/min. If pulmonary edema occurs, treat with intubation and BVM ventilation with PEEP. **DO NOT** use the Pulmonary Edema protocol if the most likely underlying diagnosis is pulmonary embolus.

Findings of sinus tachycardia and the ECG pattern S1 Q3 T3 correlates to pulmonary embolism. Lead I will show an S wave, and Lead III will have a Q wave and inverted T wave. While this pattern is not diagnostic, it may help in assessing for pulmonary embolism.



S1 Q3 T3 pattern

ABDOMINAL PAIN

CRITERIA:

NON-TRAUMATIC abdominal pain **WITHOUT** evidence of labor or trauma;
Vaginal bleeding that is non-menstrual, with or without passing of tissue

ADULT
EMT

CABC's
O₂
V/S
NPO
IF female patient with near term pregnancy,
PERINEAL EXAM

EMT - I

IV **IF** hypotensive or signs and/or symptoms of hypoperfusion

PARAMEDIC

ECG
- **Promethazine 6.25 - 12.5 mg IV** for severe nausea/vomiting. May repeat once in 15 minutes if no relief
OR
- **Ondansetron 4 mg IV** for severe nausea
Administer over 30 seconds

MEDICAL CONTROL

- **Morphine Sulphate 2 - 10 mg IV** for severe pain with clear etiology (i.e., renal calculi)
OR
- **Fentanyl 1.0 – 2.0 mcg/kg, up to 100 mcg, IV or IN** for pain up, may repeat q 15 min up to 300 mcg total

PEDI
EMT

CABC's
O₂
V/S
NPO

EMT - I

IV **IF** hypotensive or signs and/or symptoms of hypoperfusion

PARAMEDIC

ECG
Broselow Tape

MEDICAL CONTROL

- **Promethazine 0.5 mg/kg IV or IM** for nausea/vomiting
Max. single dose of **12.5 mg**
OR
- **Ondansetron 0.1 mg/kg IV** for severe nausea
Max single dose of **4 mg**
Administer over 30 seconds
- **Morphine Sulphate 0.05-0.25 mg/kg IV** for severe pain with clear etiology (i.e., renal calculi), Max. single dose of **2.0 mg**

NOTES:

History is an excellent tool for differentiating abdominal pain. Some of the data that needs to be collected includes:

- Previous episodes of pain like this? What was the diagnosis that time?
- Last meal? Last BM? Dysuria?
- Nausea or vomiting? Hematemesis?
- Alleviating/aggravating factors?
- Description of discomfort?
- Other associated signs and symptoms?
- History for female patients must include obstetric history (gravida, para, and abortions) as well as the date on which the patient's last normal menstrual period ended.

Differential diagnoses may include:

Incomplete abortion (abdominal pain with fever and purulent discharge).	Descending aortic aneurysm.
PID (symptoms as incomplete abortion, but unlikely to have been pregnant).	Peritoneal/Mesentery inflammation.
Ectopic pregnancy (missed menstrual period(s), sudden onset of severe abdominal pain and hypotension).	Appendicitis.
Abruptio placenta (generally 2nd or 3rd trimester with sudden onset of severe abdominal pain and hypotension).	GI bleeding.
Placenta Previa.	Exacerbation of ulcer.
Uterine rupture (as in abruptio).	Fecal impaction.
Non-obstetrical or gynecological etiologies	Ischemic bowel.
Angina/MI (upper abdominal or epigastric pain).	Cholecystitis

Abdominal exam must be done *carefully*. Assess for:

- Gravid uterus? (Note location of fundus relative to xiphoid or symphysis pubis)
- Tenderness?
- Masses (pulsatile?)
- Rigidity?
- Fetal movement?

In general, prehospital analgesia is not indicated in abdominal pain because of the complexities of the possible differentials and the potential need to obtain informed consent for surgery. One exception is the patient suffering from renal calculi (kidney stones), which rarely require surgery but are *extremely* painful. Be very cautious in choosing to administer analgesics to the abdominal pain patient.

A spontaneous abortions common signs/symptoms include abdominal cramps and vaginal hemorrhage, sometimes with clots and bits of tissue. All tissue and clots from the vagina should be collected and given to the receiving physician for subsequent examination. These patients need to be treated as major surgical/trauma patients, with minimal scene time. Most, if not all, of these patients will require surgical interventions.

Third trimester (>20 weeks gestation) bleeding should be transported rapidly, preferably to a "High Risk OB" facility.

TOXEMIA OF PREGNANCY/ECLAMPSIA/ PIH

CRITERIA:

Intra-uterine pregnancy of greater than 20 weeks gestation **WITH:** Hypertension (systolic BP greater than 140 mm Hg and/or diastolic BP of greater than 90 mm Hg)
AND one or more of the following: Peripheral edema, Moderate to severe nausea/vomiting, Severe headache, Altered Mental Status, Seizures

EMT

CABC's

O₂

V/S

Blood Glucose Determination: **IF** below 80 mg/dl, treat per [hypoglycemia](#) protocol

EMT - I

IV

PARAMEDIC

ECG

- **Magnesium sulfate 2.0 G IV/2.0 G IM**

IF active seizure which persists after magnesium sulfate as above:

- **Lorazepam 2 mg IV**, may repeat once in 5 minutes

- **Midazolam 0.1 mg/kg IV OR 0.3 mg/kg IN** if seizure refractory to lorazepam

- **Promethazine 6.25 - 12.5 mg IV** for severe nausea/vomiting

May repeat once in 15 minutes if no relief

OR

- **Ondansetron 4 mg IV** for severe nausea

Administer over 30 seconds

MEDICAL CONTROL

None

NOTES:

Hypertension: Pregnancy Induced Hypertension (PIH)

The hypertension associated with toxemia results in diminished perfusion of the placenta. Physiologically, both prolonged hypertension and marked hypotension result in maternal "shunting" of resources away from the fetus and back to the mother. Since the only source of perfusion available to the fetus is that provided by the placenta, diminished placental perfusion can quickly lead to fetal distress and even death. A BP of 140/90 or greater is ALWAYS significant in the third trimester patient, regardless of the lack of any findings on the mother. Pressures above this threshold are known to interfere with fetal perfusion, even though they may be insignificant to the mother's cardiovascular status.

Seizures:

The chemical changes which occur in toxemia result in a lowered seizure threshold, making the mother much more prone to convulsions. A maternal convulsion can cause hypoxia and hypoglycemia in both the mother and the fetus. Sensory stimulation (light, noise, handling) must be kept to a minimum because of this markedly diminished seizure threshold.

Magnesium sulfate ($MgSO_4$) is the therapeutic agent of choice, as it addresses both problems in toxemia. First, it is a potent vasodilator. Therefore, magnesium sulfate administration will often reduce the patient's blood pressure to an acceptable value without the need for an anti-hypertensive agent. Second, $MgSO_4$ raises the seizure threshold in the toxemic patient, making a convulsion much less likely. $MgSO_4$ IV will also often stop an active convulsion without the need for further anti-convulsant therapy. Magnesium sulfate in this setting should be administered as 2 G (4 ml of solution) diluted with 6 ml of IV fluid (to yield a total volume of 10 ml) given over 1 - 2 minutes slow IV push.

For active convulsions refractory to $MgSO_4$, lorazepam is the medication of choice. Lorazepam should be used conservatively, as it will result in fetal intoxication. Midazolam may be used if the seizures are refractory to lorazepam or if an IV line cannot be established. Lorazepam is given in 2 mg increments, midazolam is given in 0.5 to 1.0 mg increments, at 1-2 min intervals until the desired response is achieved OR maximum dose is given.

The hallmark finding which differentiates eclampsia from pre-eclampsia is CNS involvement, as indicated by altered mentation or seizures.

Watch IV fluid administration closely as not to exacerbate hypertension and edema.

LABOR & DELIVERY

CRITERIA:

- Patient with intra-uterine pregnancy of greater than 20 weeks
- Back and/or abdominal cramping or pains which occur periodically (not constant)
- Delivery of a viable fetus and of the placenta

EMT

CABC's

Perineal exam

O₂

V/S

Deliver infant: See [POST-DELIVERY CARE](#) protocol

Cut umbilical cord

Deliver placenta

IF continued post-partum bleeding:

- Uterine massage

- Encourage breast feeding

- Evacuate visible clots from vagina

EMT - I

IV

PARAMEDIC

ECG

- **Promethazine 6.25 - 12.5 mg IV** for severe nausea/vomiting

- May repeat once in 15 minutes if no relief

OR

- **Ondansetron 4 mg IV** for severe nausea, administer over 30 seconds

MEDICAL CONTROL

IF premature labor contractions:

- **Terbutaline 0.25 mg SQ**

- May repeat every 10 minutes PRN

- **NS 1000 ml** rapid IV infusion if premature delivery is imminent

NOTES:

Assess the need of field delivery by:

- Performing a perineal exam to check for crowning. **Always do this immediately after ensuring the mother's CABC's.**
- Evaluating transport time.
- Evaluating gravida status of mother. The more pregnancies, the greater the risk of a rapid delivery.
- Assessing whether the mucous plug been passed or the amniotic sac has ruptured.
- Asking if mother has felt baby move recently.
- Asking if mother feels like having a bowel movement.
- Evaluating interval and length of contractions.
- If contractions are <2 to 3 min apart and last >45 sec each, then delivery is probably imminent.

If longer than 10 minutes transport and a Gravida 2 or more, BOWR, baby appears to not be moving and mother feels the urge for a B/M, prepare to deliver. In addition, if crowning or vaginal "gaping" is noted, birth is imminent.

True labor is characterized by:	False labor is characterized by:
Contractions occurring at regular intervals.	Contractions that occur at irregular intervals.
Intervals of contractions that gradually shorten.	Intervals that remain long.
Intensity of pain gradually increasing.	Intensity that remains the same.
Discomfort mostly of the back, less on the abdomen.	Pain that is mostly on the abdomen.
Pain/contractions that are intensified by walking.	Pains/contractions that subside or are not affected by walking.
A bloody show (usually).	A lack of bloody show.

History to obtain includes:

- Was prenatal care obtained?
- Whether this is a high risk pregnancy.
- For the possibility of multiple fetuses.
- Whether there is diabetes associated with this gestation.
- About any predisposing risk factors (hypertension, ASCVD, or other maternal problems).
- Date that the last normal menstrual cycle ended.
- About any previous episodes of obstetrical complications.
- The para, gravida, and abortion history.
- Any headaches, seizures, or visual disturbances.
- False contractions or abnormal abdominal discomforts.
- Rupture of the amniotic sac (BOWR) or hemorrhage.

As soon as it is evident that a delivery is imminent, prepare for delivery by:

- Placing mom supine, with feet on flat surface and knees bent.
- Placing clean sheet/delivery towel under buttocks area.
- Removing underwear and constricting clothing.
- Washing your hands if possible.
- Opening OB kit and while maintaining as sterile a field as possible, glove-up.
- Having mom pant during contractions.
- Re-check for crowning.

Pre-partum transport is done with the gravid female lying left lateral recumbent on the stretcher without underwear, unless medical procedures or interventions require another position. Place clean sheet or delivery towel under her buttocks. Cover the patient with sheets/blankets to protect privacy, but check for crowning regularly.

Do not pull on the umbilical cord to aid in placental delivery. Placental delivery will be followed by some vaginal hemorrhage. One to two cups of maternal blood loss is normal. Place a dressing over the vaginal opening and observe for perineal tears. Have mom lower her legs and bring close together. Elevate feet slightly. To help contract the uterus, lightly massage it. Nursing the baby will contribute to uterine tissue contraction which will help control/stop the bleeding. The provider may also gently manually evacuate any visible clots from vagina, as this will also help stop post-partum bleeding. Provide comfort...Provide warmth.

COMPLICATIONS OF DELIVERY

EMT

EMT-I

PARAMEDIC

Prolapsed Cord:

As the neonate's head attempts to enter the vaginal canal, it will squeeze the cord thus effectively shutting off the only source of oxygenated fetal blood. Place the mother in knee to chest prone position ("praying-like"). Gather exposed section of cord into gloved hand and insert hand (and cord) into vagina as far as necessary to make contact with the baby's head. Gently push back on the head so that it is no longer compressing the cord. Transport rapidly while administering oxygen to the mother and maintaining pressure on baby's head. Reintroduction of the cord into the vagina preserves the cord's viability better than covering it with a dressing. **However, removing any impingement (i.e., the baby's head) from the cord and rapid transport take precedence over any other intervention.**

Breech presentation:

Breech presentations may be delivered successfully in the field. The body generally delivers easily. The head, being the largest part, may present some difficulties. Support the body as the head is delivered. If necessary, insert two fingers in a "V" shape on either side of the baby's nose to provide an airway while completing the delivery. If the baby's head does not deliver in less than 2-3 min, gentle pressure over the lower uterus may be of help. If delivery still does not progress, transport urgently.

Cord around neck (nuchal cord) presentation:

Babies present occasionally with the umbilical cord wrapped around the neck. Attempt to gently slide it over the neonate's head. If it is too tightly wrapped, clamp and cut the cord. Assure that the baby has an airway, and preferably has already been suctioned.

Limb Presentation:

Transverse lies are not deliverable in the field. The mother should be positioned in Trendelenburg and slightly left lateral or in "knee-chest" position. Provide oxygen. **Transport immediately.** Once en route, insert a gloved hand into the vagina (vaginal exam) to ascertain if the infant's head has entered the canal with the limb. If it has, gently push the vaginal wall away from the infant's face to provide an airway. Place O₂ tubing with high-flow oxygen at vaginal opening to help oxygenate the baby. If the infant's head has not entered the canal, remove hand and continue with the other required therapies.

Unbroken amniotic sac:

Occasionally, babies present with an unbroken amniotic sac. Normal delivery after tearing the sac with fingers or hemostats can be easily accomplished.

Precipitous Delivery:

This term refers to the unexpected or unusually rapid delivery of an infant. It is usually related to traumatic events, distressed (physically or emotionally) mothers and uneducated multigravida patients. If the baby has not yet delivered, assist and manage as per specific situations found elsewhere in this reference. If delivery has occurred, check the ABC's on baby, **DRY, WARM, and STIMULATE ASAP.**

Premature Births:

By definition, pre-term neonates are of less than 36 weeks gestation and are usually less than 2500 grams. "Preemies" should be able to be delivered as a normal infant. They require more conscientious drying and warming procedures and careful evaluation of the umbilical cord to assure there will be no loss of blood, as they are much more prone to hypothermia and have a smaller blood volume. They are also very prone to hypoglycemia, so a blood glucose evaluation is important. Oxygen via blow-by is also important.

Multiple Births:

One of every 80 births are multiple fetuses. Fraternal twins each have their own placenta. Identical twins share the same placenta. Suspect multiple births if abdominopelvic area seems disproportionally large after first baby is delivered (multiple babies are small) and if strong contractions continue. Labor for the second baby may start again 10 minutes after the first delivery is completed. After completion of first delivery, clamp the cord and prepare to deliver the following infant. If delivery does not begin in less than 10 minutes, transport.

Uterine Inversion (prolapsed uterus):

Uterine inversion is defined as the turning "inside-out" of the uterus. The uterus or part of the uterus protrudes outside the vagina. This usually involves atrophied pelvic floor muscles. It is possible to cause uterine prolapse by "tugging" on the cord to "aid" in placental delivery. Severe shock can result. **Do not** remove the placenta from uterus if it is still attached. Make **ONE** attempt to manually reintroduce the uterus into the abdominal cavity by placing a gloved closed fist against uterine wall and firmly pressing the organ back into the vagina. If this attempt does not result in return of the uterus to the abdomen, do not attempt again. Simply cover the exposed tissues with moist sterile dressings, followed by dry ones to preserve heat and provide rapid transport.

Post delivery bleeding:

Some hemorrhage is normal during delivery. With large neonates or explosive traumatic deliveries, significant post partum hemorrhage may be found. Place pads externally over the vaginal opening observe for perineal lacerations. Treat for shock if indicated. If significant bleeding continues, gently manually evacuate visible clots from the vagina. Evacuation of clots encourages uterine contraction and therefore controls bleeding.

POST-DELIVERY CARE OF THE NEONATE

CRITERIA:

Care and resuscitation of the newborn infant

EMT

Dry, warm, position, stimulate

Suction if fluids/obstruction present

Assessment (respirations, heart rate, color) [APGAR](#) at 1 and 5 minutes

IF indicated: O₂

IF indicated: BVM assist

IF HR < 60: Chest compressions

EMT - I

IF indicated: Intubation

IF indicated: IV or IO

PARAMEDIC

Broselow Tape

ECG

IF HR still < 60:

- **Epinephrine (1:10,000) 0.01 mg/kg IV** (0.02 mg/kg ET)

Repeat q 3-5 min

Blood Glucose Determination

IF blood glucose is below 40 mg/dl:

- **D25% 0.5 G/kg (2 ml/kg) IV/IO**

IF persistent obtundation **AND** suspicion or evidence of maternal narcotic use:

- **Naloxone 0.1 mg/kg IV/IO/ET**, max. single dose of **2.0 mg**

Repeat every 2-3 minutes as needed

MEDICAL CONTROL

- **Atropine 0.02 mg/kg IV** for persistent bradycardia, min. single dose of **0.1 mg**, max. single dose of **0.5 mg**. Max. total dose of **1 mg**

Repeat **D/25% 0.5 G/kg (2 ml/kg) IV/IO** if continued evidence of hypoglycemia

Sodium Bicarbonate 1 mEq/kg (4.2% solution) IV if evidence of metabolic acidosis

NOTES:

Dry/Warm as newborns have difficulty tolerating a cold environment. Hypoxic infants are particularly at risk, and recovery from acidosis is delayed by hypothermia. Heat loss may be prevented by 1) quickly drying the infant of amniotic fluid 2) wrapping the infant in a blanket and then a silver swaddler 3) placing the child next to the mother with covers over both.

Position the neonate on his/her back or on the left side in a slight Trendelenburg position with the neck slightly extended. A 1-inch thickness of towels or blankets placed under the infant's shoulders will help to maintain proper positioning of the airway.

Stimulation by drying the neonate usually induces effective respirations in most infants. If not, there are two additional safe methods of providing tactile stimulation; slapping or flicking the soles of the feet, or rubbing the baby's back. More vigorous means of stimulation should be avoided. If the infant does not adequately initiate respirations following a brief period of stimulation (30 seconds), positive-pressure ventilation is required.

Neonate Assessment and Interventions:

Respirations: spontaneous respirations should start within 30 seconds of delivery. Breathing rate and depth should increase immediately with brief stimulation. If the respiratory response is appropriate, the heart rate is evaluated next. If the respiratory response is inappropriate (shallow, slow, or absent respirations), positive pressure ventilations should be started immediately.

Heart rate: The presence of respirations does not guarantee an adequate pulse rate. If the heart rate is > 100 beats/min and spontaneous respirations are present, the assessment is continued. If the heart rate is < 100 beats/min, positive-pressure ventilations should be started immediately.

Color: An infant may occasionally be cyanotic despite adequate ventilations and a heart rate > 100 beats/min. If central cyanosis is present in an infant with spontaneous respirations and an adequate heart rate, free-flow oxygen should be given until the cause can be further evaluated. Cyanosis of the hands and feet (acrocyanosis) is normal in the neonate.

Initiate Positive Pressure Ventilations (BVM) IF:

- Apnea
- Heart rate < 100
- Central cyanosis while on 100 % oxygen

Ventilation rate should be 40-60 breaths per minute

Initiate Chest Compressions IF:

The heart rate is < 60 beats/min . If despite adequate ventilations, the heart rate is < 80 beats/min, positive-pressure assisted ventilations should be continued and chest compressions initiated. The sternum should be compressed ~1 ½ inches at a rate of 100 times/min.

Indications for Endotracheal Intubation:

- Bag-mask ventilation is ineffective or inadequate
- Prolonged positive-pressure ventilation is necessary
- Tracheal suctioning is required.
- Meconium present in the oropharynx

Indications for IV include:

- Signs/symptoms of hypoperfusion, hypovolemia, or dehydration
- The need to administer parenteral medications.

IO is indicated in the critically ill patient in whom IV access cannot be obtained in 2 attempts or 90 seconds.

Hypoglycemia is common in infants and children with a hypoxic insult or other stress. In full term infants, blood sugar levels < 40 mg/dl are considered hypoglycemic; in low birth weight infants, < 20 mg/dl. The blood glucose levels should be monitored and D25% 0.5-1.0 G/kg (2-4 ml/kg) administered if indicated. For the infant < 10 kg, dilute D50% with an equivalent quantity of NS to create D25%, yielding 0.25 Gm/ml.

Meconium aspiration is a major cause of infant morbidity and death. If meconium is not adequately removed from the airway prior to the onset of respiration, a high percentage of infants will aspirate it and develop respiratory distress, pneumonia and pneumothorax. Infants born with meconium staining require immediate suctioning of the oropharynx before initiation of respiration and, therefore, before completion of the delivery. Suctioning should be performed after the head, but not the rest of the body, is delivered. If spontaneous respirations have begun, and the oropharynx is not clear of meconium, the trachea should be intubated **at once**. Suction should be applied directly to the endotracheal tube and continued while the tube is removed. If large amounts of meconium are recovered, this procedure may need to be repeated several times.

AMPUTATED PARTS

CRITERIA:

A part that is pathologically or surgically totally separated (removed) from the rest of the body

ADULT	PEDI
EMT	EMT
CABC's O ₂ Control hemorrhage V/S Transport amputated part (SEE NOTES)	CABC's O ₂ Control hemorrhage V/S Transport amputated part (SEE NOTES)
EMT - I	EMT - I
IV	IV
PARAMEDIC	PARAMEDIC
ECG - Fentanyl 1.0 – 2.0 mcg/kg, up to 100 mcg, IV or IN for pain up, may repeat q 15 min up to 300 mcg total - Promethazine 6.25 - 12.5 mg IV for severe nausea/vomiting May repeat once in 15 minutes if no relief - Ondansetron 4 mg IV for nausea	ECG Broselow Tape - Fentanyl 1.0 – 2.0 mcg/kg, up to 50 mcg, IV or IN for pain May repeat in 15 minutes if no relief, up to three total doses (150 mcg maximum)
MEDICAL CONTROL	MEDICAL CONTROL
None	None

NOTES:

Amputations are disabling and sometimes life-threatening injuries. They have the potential for massive hemorrhage but most often, the bleeding will control itself quite readily with ordinary pressure applied to the stump. The stump should be covered with a damp sterile dressing and an elastic wrap that will apply uniform, reasonable pressure across the entire stump. If bleeding absolutely cannot be controlled with pressure, a tourniquet may be used.

Amputated parts should be rinsed with sterile normal saline, placed in a plastic bag, and kept cool during transport to the hospital.

Amputated parts should **NOT** be:

- Soaked or placed in water
- Covered with wet gauze or towels
- Placed directly on ice or ice packs, as this can result in frost bite

The patient should be transported directly to a facility capable of performing reattachments, if the part appears at all salvageable.

CRUSH INJURY

CRITERIA:

Patient crushed and entrapped in debris with compression of limbs and/or torso

ADULT	PEDI
EMT Ensure safety of rescuers Obtain access to patient CABC's O ₂ V/S	EMT Ensure safety of rescuers Obtain access to patient CABC's O ₂ V/S
EMT - I IV Determine duration of entrapment IF entrapment < 1 hour: - NS IV, titrated to BP > 90	EMT - I IV Determine duration of entrapment IF entrapment < 1 hour: - NS IV, titrated to BP > 70+ (2 X age)
PARAMEDIC IF entrapment > 1 hour: - NS IV run at 1000 ml/hr Add 50 mEq Sodium Bicarbonate to even numbered liters of IV fluids (i.e. 2 nd , 4 th , etc.) ECG	PARAMEDIC ECG Broselow Tape
MEDICAL CONTROL None	MEDICAL CONTROL - NS infusion with Sodium Bicarbonate IV : Contact OLMC for concentration and rate

NOTES:

If the patient is entrapped, ensure the safety of all rescuers before initiating rescue attempts. Ensure that only properly trained and equipped personnel enter confined spaces or collapse zones. If the patient's location is such that rescuers could be endangered, establish a perimeter, cease any ongoing rescue efforts and call for specialized rescue personnel.

Early fluid resuscitation is the key to avoiding renal failure in patients with crush syndrome. An IV of Normal Saline should be established, preferably prior to release of the compressive forces from the patient. Determine the length of time that the patient has been trapped and run the IV accordingly.

Sodium Bicarbonate added to the IV solution will help prevent acidosis and decrease the renal damage caused by myoglobin. Add 50 mEq to every other liter of IV solution (i.e. the 2nd, 4th, etc.).

Estimate the patient's urine output if possible (as a Foley catheter is impractical in this situation). Be aware of dark colored urine as this indicates myoglobinuria.

MUSCULO-SKELETAL/SOFT TISSUE INJURY

CRITERIA:

Isolated musculo-skeletal/soft tissue injury in the absence of significant head, chest, abdominal, or multi-systems injury

Mechanism of injury capable of resulting in a musculo-skeletal injury

Pain on palpation or movement, or ecchymosis, swelling, or deformity to area

ADULT	PEDI
EMT	EMT
CABC's O ₂ Control hemorrhage: - Direct pressure - Hemostatic dressing - Tourniquet V/S Splint/immobilize	CABC's O ₂ Control hemorrhage: - Direct pressure - Hemostatic dressing - Tourniquet V/S Splint/immobilize
EMT - I	EMT - I
IV IF: Open fracture Closed femur fracture Hypotension or other signs of hypo-perfusion	IV IF: Open fracture Closed femur fracture Hypotension or other signs of hypo-perfusion
PARAMEDIC	PARAMEDIC
ECG IF IV - Fentanyl 1.0 – 2.0 mcg/kg, up to 100 mcg, IV or IN for pain May repeat in 15 minutes if no relief, up to three total doses (300 mcg maximum) - Promethazine 6.25 - 12.5 mg IV for severe nausea/vomiting May repeat once in 15 minutes if no relief - Ondansetron 4 mg IV for nausea	ECG IF IV Broselow Tape - Fentanyl 1.0 – 2.0 mcg/kg, up to 50 mcg, IV or IN for pain May repeat in 15 minutes if no relief, up to three total doses (150 mcg maximum) - Ondansetron 0.1 mg/kg IV for severe nausea Max single dose of 4 mg Administer over 30 seconds
MEDICAL CONTROL	MEDICAL CONTROL
Fracture reduction if distal circulation acutely compromised	Fracture reduction if distal circulation acutely compromised

NOTES:

Always evaluate distal circulation and neurological function before and after immobilizing a suspected fracture or dislocation.

Cooling (i.e., ice pack) should be used to minimize swelling for a musculo-skeletal injury that has occurred in the past 12 hours.

Consider reduction of the severely angulated fracture without a distal pulse. If the on-line physician approves reduction, use firm traction and attempt to re-align limb. No more than one attempt may be taken.

Pain management is important in musculo-skeletal injuries. Aggressive, early manual support and effective immobilization are the best ways to decrease pain. IV or IN analgesia should be used for those patients who continue to experience considerable pain after immobilization. Analgesia may be indicated in certain cases before immobilizing or moving the patient.

Femur fractures are best managed with traction. Traction will relieve pain and decrease available space in the thigh, which in turn will control bleeding.

Traction splint is contraindicated in:

- Pelvic or trochanter fracture
- Knee disruption
- Associated fracture distal to the knee

HEAT RELATED EMERGENCIES

CRITERIA:

Heat Cramps

- Environmental evidence of heat cramps (hot, humid), **AND**,
- Cramps in extremities, **AND**,
- **WITHOUT** signs or symptoms of heat exhaustion

Heat Exhaustion

- Environmental evidence of heat exhaustion (hot, humid), **AND**
- Weakness, vertigo, nausea or syncope
- Profuse sweating, tachycardia
- Temperature normal or 1-2 degrees elevated

Heat Stroke

- Temperature of 105° F (40.6° C) or greater, **AND**
- Altered mentation, **OR**
- Seizure

ADULT

EMT

CABC's
 Remove patient from hot environment
 V/S
 External cooling
IF NOT nauseated:
 - Electrolyte replacement drink 250-500 cc slow p.o.
 Blood Glucose Determination:
IF below 80 mg/dl, treat per [Hypoglycemia](#)

EMT - I

IV 250-500 cc/hr
IF Heat Stroke: IV 500-1000 cc/hr

PARAMEDIC

IF active seizures or shivering:
 - **Lorazepam 2-4 mg IV**, may repeat once in 10 minutes
 - **Midazolam 0.3 mg/kg IN up to 5 mg** if IV not available

MEDICAL CONTROL

Additional Lorazepam or Midazolam

PEDI

EMT

CABC's
 Remove patient from hot environment
 V/S
 External cooling
IF NOT nauseated:
 - Electrolyte replacement drink 250-500 cc slow p.o.
 Blood Glucose Determination:
IF below 80 mg/dl, treat per [Hypoglycemia](#)

EMT - I

IV 15-20 cc/kg/hr
IF Heat Stroke: IV/IO at 50-100 cc/kg/hr

PARAMEDIC

IF active seizures or shivering:
 - **Lorazepam 0.1 mg/kg IV, up to 2 mg max**, may repeat once in 10 minutes
 - **Midazolam 0.3 mg/kg IN up to 5 mg** if IV not available

MEDICAL CONTROL

Additional Lorazepam or Midazolam

NOTES:

HEAT CRAMPS

DO NOT massage cramping muscles, as this usually worsens cramps.

External cooling should be accomplished by:

- Removing excessive clothing
- Sponging patient with wet towels
- Fanning patient to promote evaporation.

The evaporation of water from the patient's skin is the most effective method of external cooling. Ice packs to the head, neck, and groin will also help.

Be careful not to overcool. If patient shivers, **STOP** cooling and lightly cover patient. Shivering will generate enormous heat. PO electrolyte replacement must be given slowly, in sips, to avoid precipitating nausea or vomiting. IV, if used, must be NS at approximately 250 ml/hr. Continue to infuse IV until symptoms are resolved.

HEAT EXHAUSTION

O₂ should be at highest concentration tolerated by patient.

External cooling should be accomplished by:

- Removing excessive clothing
- Sponging with wet towels
- Fanning patient.

The evaporation of water from the patient's skin is the most effective method of external cooling. Ice packs to the head, neck, and groin will also help.

AVOID OVERCOOLING--If patient shivers, stop cooling and cover patient. Shivering will generate enormous heat. Heat exhaustion patients are frequently nauseated. Avoid oral fluids if patient complains of nausea. If the patient is not nauseated, cool PO fluids can be administered. Use an electrolyte-containing solution (such as Gatorade) if possible. Have the patient take small sips so as not to precipitate nausea/vomiting. IV should be NS at 250 ml/hr or higher.

HEAT STROKE

True heat stroke is an immediate, life-threatening emergency. The patient's normal heat regulating mechanisms have failed and his core temperature will rapidly rise, resulting in irreversible damage to internal organs. *Aggressive* cooling must be instituted as soon as possible.

Oxygen must be by NRB at 10-15 l/min or BVM assist.

External cooling is accomplished by:

- Remove patient's clothing
- Cover with cool/cold water
- Fan patient vigorously

Target the patient's temperature at 102° F (39° C) using frequent serial measurements. Stop external cooling when temperature reaches 102° F. If the patient is cooled too rapidly past this point shivering may begin which generates a tremendous amount of heat.

Shivering must be controlled with a benzodiazepine, as shivering will generate enormous heat.

IV must be NS at 500 - 1000 ml/hr. IV fluid should be cooled if possible.

HYPOTHERMIA

CRITERIA:

Temperature of 90° (32° C) or less, **AND** altered mental status, **OR** uncoordinated physical activity and no shivering

ADULT

EMT

CABC's
Handle patient gently
O₂, preferably warmed and humidified
IF respirations less than 12/min:
- BVM assist at 12-15/min initially:
Ventilate at a rate to obtain SpO₂ > 95% and
ETCO₂ between 35 and 45 mmHg
Measure temperature (temporal scan, or
rectal)
External warming
Blood Glucose Determination: **IF** below 80
mg/dl, treat per [hypoglycemia](#) protocol

EMT - I

IV, preferably warmed

PARAMEDIC

ECG

MEDICAL CONTROL

IF metabolic acidosis likely:
- **Sodium bicarbonate 1 mEq/kg IV**
Other medications based on temperature and
cardiac dysrhythmias

PEDI

EMT

CABC's
Handle patient gently
O₂, preferably warmed and humidified
IF respirations less than 14/min:
- BVM assist at 12-15/min initially:
Ventilate at a rate to obtain SpO₂ > 95% and
ETCO₂ between 35 and 45 mmHg
Measure temperature (temporal scan, or
rectal)
External warming
Blood Glucose Determination: **IF** below 80
mg/dl, treat per [hypoglycemia](#) protocol

EMT - I

Broselow Tape
IV, preferably warmed, 10-15 ml/kg/hr

PARAMEDIC

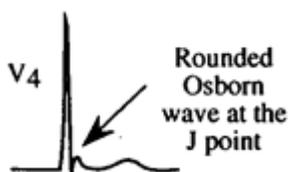
ECG

MEDICAL CONTROL

IF metabolic acidosis likely:
- **Sodium bicarbonate 1 mEq/kg IV**
Other medications based on temperature and
cardiac dysrhythmias

NOTES:

Minimize agitation and physical "handling" of the patient, as hypothermia reduces the dysrhythmia threshold. Hypothermia patients are often malnourished and/or hypoglycemic. Always assess the blood glucose level. There is still some debate about the role of medication administration in hypothermia. OLMC should be consulted prior to initiating procedures beyond those noted in the protocol.



The ECG may demonstrate "J" or Osborn waves, which indicate myocardial hypothermia. However, the absence of these waves does not rule out hypothermia.

NEAR DROWNING

CRITERIA:

Water submersion **WITHOUT** cardiopulmonary arrest and **WITHOUT** evidence of hypothermia

ADULT	PEDI
EMT CABC's Remove from water O ₂ V/S	EMT CABC's Remove from water O ₂ V/S
EMT - I IV CPAP at 5 cm H ₂ O if evidence of pulmonary edema IF intubation is required: - PEEP at 20 cm H ₂ O	EMT - I IV IF intubation is required: - PEEP at 10 cm H ₂ O
PARAMEDIC ECG Treat dysrhythmias as per specific protocol IF unconscious: - NG intubation	PARAMEDIC ECG Treat dysrhythmias as per specific protocol IF unconscious: - NG intubation
MEDICAL CONTROL Sodium bicarbonate 1.0 mEq/kg IV if metabolic acidosis evident	MEDICAL CONTROL Sodium bicarbonate 1.0 mEq/kg IV if metabolic acidosis evident

NOTES:

If hypothermic, treat as per [Hypothermia](#) protocol.

If lung auscultation reveals water aspiration, additional respiratory support is indicated. If patient's mental status and tidal volume are adequate, CPAP may be used. If patient is unconscious or requires intubation, Positive End Expiratory Pressure (PEEP) should be used. See [PEEP](#) procedure.

Oxygen should be 100% by BVM assist unless the patient's mental status and tidal volume are good, then use an NRB mask.

If gastric distention inhibits the patient's tidal volume, the Heimlich may be used to reduce it. The patient should also then have an NG tube placed.

IV should be NS at TKO. If hypotensive run the IV wide open and titrate to a systolic BP of 100 mm Hg or higher (70 + (2 X age) for pedis).

BITES AND STINGS

CRITERIA:

Known or suspected envenomation by hymenoptera (wasp, etc.), Brown Recluse spider, or Black Widow spider

Known or suspected bite by a venomous snake with fang marks, swelling and pain at wound site

ADULT

EMT

CABC's

O₂

V/S

IF allergic reaction: Follow [allergic reaction](#) protocol

IF snakebite:

Keep patient supine

Immobilize limb with splint at the level of the heart

DO NOT APPLY ICE, COLD PACK OR ARTERIAL TOURNIQUET

If possible identify the type of snake involved

IF coral snake bite: Wash wound immediately with copious amounts of water

EMT - I

IV

PARAMEDIC

ECG

IF active seizures or severe muscle cramping (tetany):

- Lorazepam 2 mg IV, may repeat once in 10 minutes

MEDICAL CONTROL

Additional lorazepam IV or midazolam for continued seizures or tetany

Contact OLMC for appropriate facility for antivenin treatment

PEDI

EMT

CABC's

O₂

V/S

IF allergic reaction: Follow [allergic reaction](#) protocol

IF snakebite:

Keep patient supine

Immobilize limb with splint at the level of the heart

DO NOT APPLY ICE, COLD PACK OR ARTERIAL TOURNIQUET

If possible identify the type of snake involved

IF coral snake bite: Wash wound immediately with copious amounts of water

EMT - I

IV

PARAMEDIC

ECG

IF active seizures or severe muscle cramping (tetany):

- Lorazepam 0.1 mg/kg IV, up to 2 mg max, may repeat once in 10 minutes

MEDICAL CONTROL

Additional lorazepam IV or midazolam for continued seizures or tetany

Contact OLMC for appropriate facility for antivenin treatment

NOTES:

Symptoms and findings of insect envenomations include:

Ants, Bees, and Wasps: Symptoms: Immediate pain; Findings: Vary from local reaction to anaphylaxis

Brown Recluse: Symptoms: Localized, immediate pain, nausea and vomiting, weakness; fever; Findings: blister forms at the bite, which develops into an ulcerative lesion, cardiac dysrhythmia, hemolysis, renal failure, shock

Black Widow: Symptoms: immediate pain which may subside, muscle cramps and muscle pain develops in 1/2 to 2 hours after bite, weakness, back and abdominal pain; Findings: muscle rigidity (tetany), convulsions, respiratory paralysis

Not all bites by poisonous snakes actually result in envenomation; in fact, only about 50% do. However, EMS personnel should assume that if the patient has been bitten by a known venomous snake, or by any type of unknown snake, that he/she has been envenomated.

Movement expedites the spread of the venom. Therefore, the patient's physical activity **MUST** be kept to an absolute minimum.

There is much debate concerning the usefulness of constricting bands. At this point, they cannot be clearly supported or eliminated from use. If utilized, **be certain** that the constricting band is obstructing venous flow only, and that the patient retains a good pulse distal to the band.

Ice or cooling to the bite area results in more severe tissue damage and has little effect on venom movement.

The venom of pit vipers is primarily a hemotoxin with some neurotoxic components. With these bites the patient may present with a wide range of symptoms and signs, varying from little or no local reaction to massive local tissue destruction and generalized hemolysis, shock, kidney failure, and perhaps ultimately widespread ischemia and infarcts.

Factors which influence the patient's clinical status include:

- Whether or not the snake actually envenomated the victim
- The size of the snake in relation to the size of the victim; in general, the larger the snake and/or the smaller the victim the more severe the consequences of a bite
- The type of snake; copperhead bites are generally less toxic than water moccasin bites, which in turn are less toxic than rattlesnake bites. Coral snakes, although possessing much more toxic venom, rarely inject an adequate volume to result in severe illness. Conversely, pit vipers generally inject a much greater volume.

The coral snake's venom (saliva) is essentially a neurotoxin, resulting in altered mentation, seizures, peripheral motor difficulties, paresthesias, respiratory depression and paralysis. Significant envenomation by a coral snake carries a very high mortality rate. Bites by the coral snake are very rare, as the snake itself is uncommon and it is also very unaggressive.

OVERDOSE AND POISONING

CRITERIA:

Known or suspected ingestion/injection of a pharmaceutical substance, intentional or accidental
Ingestion, inhalation, or absorption of potentially harmful, non-pharmaceutical substance

ADULT

EMT

IF inhalation poisoning, remove from environment NOW
Decontaminate patient/DO NOT expose responders
CABC's
O₂
V/S
Blood Glucose Determination: **IF** below 80 mg/dl, treat per [hypoglycemia](#) protocol
IF contact (absorption) poisoning, begin brushing off and/or flushing, and continue throughout transport

EMT - I

IV

PARAMEDIC

ECG
IF suspected opiate or unknown ingestion:
- **Naloxone 0.5 - 2 mg IV:**
 May repeat every 10-15 min PRN if patient responds to initial dose, up to **8 mg** total
- **Naloxone 2 mg IN** if IV route is delayed or unavailable

IF dystonic reaction:

- **Diphenhydramine 25 - 50 mg IV or IM**

IF TCA overdose with significant CNS or cardiovascular symptoms:

- **Sodium bicarbonate 1.0 mEq/kg IV**
- Followed by: **Sodium Bicarbonate IV infusion 0.05 mEq/ml** titrated to systolic BP > 90 mm/hg

IF organophosphate poisoning **WITH** parasympathetic symptoms:

- **Atropine 2.0 mg IV**, repeat every 5 minutes PRN

PEDI

EMT

IF inhalation poisoning, remove from environment NOW
Decontaminate patient/DO NOT expose responders
CABC's
O₂
V/S
Blood Glucose Determination: **IF** below 80 mg/dl, treat per [hypoglycemia](#) protocol
IF contact (absorption) poisoning, begin brushing off and/or flushing, and continue throughout transport

EMT - I

IV

PARAMEDIC

ECG
IF suspected opiate or unknown ingestion:
- **Naloxone 0.1 mg/kg IV**, max dose of **2 mg**
 May repeat every 10-15 min PRN if patient responds to initial dose, up to **8 mg** total
- **Naloxone 2 mg IN** if IV route is delayed or unavailable

IF dystonic reaction:

- **Diphenhydramine 1 mg/kg IV o r IM** max dose 25 mg

IF TCA overdose with significant CNS or cardiovascular symptoms:

- **Sodium bicarbonate 1.0 mEq/kg IV**
- Followed by: **Sodium Bicarbonate IV infusion 0.05 mEq/ml** titrated to systolic BP > (70 +2 X age)

IF organophosphate poisoning **WITH** parasympathetic symptoms:

- **Atropine 0.02 mg/kg IV**, repeat every 5 minutes PRN

PARAMEDIC

IF suspected CO poisoning (see NOTES):
- CPAP at 5 cm H₂O
IF available at scene:
For treatment of unconscious smoke inhalation/suspected cyanide poisoning:
Cyanokit (hydroxocobalamin) 5 G IV infusion over 15 minutes

MEDICAL CONTROL

NG intubation and lavage if indicated
IF β-blocker overdose:
Consider **Glucagon 1-2 mg IV**
- **Sodium bicarbonate 1.0 mEq/kg IV** if metabolic acidosis likely

NOTES:

Poison Control may be used as an adjunct to the EMS personnel to help determine toxicity thresholds, predict clinical manifestations, and select treatment courses. **TREATMENT RECOMMENDATIONS BY POISON CONTROL DO NOT QUALIFY FOR MEDICAL CONTROL ORDERS NOR MAY SUPERSEDE STANDING ORDERS.**

Naloxone IN or IM may be administered to any patient with suspected opiate overdose, particularly if the patient has constricted pupils, respiratory depression or AMS.

Sodium bicarbonate is used to treat tricyclic antidepressant overdoses with CNS symptoms or cardiac dysrhythmias. Administer a bolus of 1 mEq/kg, and follow with an infusion titrated to systolic BP > 90 mm/hg. Prepare the infusion by injecting 50 mEq into 1000 ml bag of NS, or 25 mEq into a 500 ml bag.

Glucagon is an inotropic agent that increases force of myocardial contraction through non-α, non-β receptors. It can be useful in mild to moderate shock induced β-blocker overdose. Glucagon should be administered with MC's approval at 1-2 mg IV push. Vasopressors such as dopamine may also be required.

Patients that have suffered carbon monoxide (CO) poisoning and either were or are unconscious should be transported to a hyperbaric chamber. These patients should receive 100% oxygen throughout care and transportation. If carboxyhemoglobin monitoring is available: symptomatic (dizziness, nausea, headache, etc.) patients with readings > 10% or asymptomatic patients with levels > 20% should be transported.

ANY PATIENT THAT REQUIRES DECONTAMINATION MUST UNDERGO PROPER DECONTAMINATION PROCEDURES PRIOR TO TRANSPORT.

Advise the hospital as soon as possible during transport so that they may prepare for additional decontamination after the patient arrives at their facility.

PARAMEDIC

Broselow Tape

MEDICAL CONTROL

NG intubation and lavage if indicated
- **Sodium bicarbonate 1.0 mEq/kg IV** if metabolic acidosis likely

HYDROFLUORIC ACID EXPOSURE

CRITERIA:

Any hydrofluoric acid exposure to the skin or eyes or by inhalation or ingestion should be treated

Note: The calcium gluconate solutions in this protocol are not carried by MMS responders. This protocol is intended as a guideline for Paramedics to implement using industrial kits stocked at the applicable sites.

EMT

Prevent rescuer exposure and ensure BSI precautions
CABC's
O₂ if needed, or if exposure by inhalation
V/S

PARAMEDIC

ECG

Skin Burns: Any concentration HF

Remove any affected clothing
Flush with copious amounts of water
Liberally and continuously massage 2.5% calcium gluconate gel into affected area
Watch for systemic effects, especially if area is > 25 cm²

Eye Exposure: Any concentration HF

Flush with copious amounts of water or saline
Apply 1-2 gtts tetracaine to affected eyes
Flush with 1% calcium gluconate irrigation

Inhalation: Any concentration HF

Administer 2.5% calcium gluconate by nebulizer continuously
Watch for bronchoconstriction, pulmonary edema, and systemic effects

Ingestion: Any concentration HF

Have patient drink several glasses of water
Follow with two glasses of milk
Watch for systemic effects
Transport immediately

MEDICAL CONTROL

None

NOTES:

Hydrofluoric (HF) acid, one of the strongest inorganic acids, is used mainly for industrial purposes (eg: glass etching, metal cleaning, electronics manufacturing). HF acid also may be found in home rust removers. Exposure usually is accidental and often is due to inadequate use of protective measures.

HF acid burns are a unique clinical entity. Dilute solutions deeply penetrate before dissociating, thus causing delayed injury and symptoms. Burns to the fingers and nail beds may leave the overlying tissue intact.

Severe burns occur after exposure of concentrated (ie: 50% or stronger solution) HF acid to 1% or more body surface area (BSA), exposure to HF acid of any concentration to 5% or more BSA, or inhalation of HF acid fumes from a 60% or stronger solution. The vast majority of cases involve only small areas of exposure, usually on the digits

Treatment for HF acid burns includes basic life support and appropriate decontamination, followed by neutralization of the acid by use of calcium gluconate. If exposure occurs at an industrial site, obtain and transport any available treatment literature.

This protocol authorizes MMS personnel to utilize antidote kits commonly stocked at industrial sites where HF is exposure is a possibility. Because of the infrequency of this exposure, MMS responders are not required to stock these antidote kits on their apparatus.

HYPOGLYCEMIA

CRITERIA:

Blood Glucose of less than 80 mg/dl (< 40 mg/dl for newborn infants), **AND**
Altered mentation, **OR** Other signs/symptoms of hypoglycemia, including: tremors,
weakness/nausea, intense hunger

ADULT	PEDI
EMT	EMT
CABC's O ₂ V/S Blood Glucose Determination IF intact gag and adequate mental status: Glucose Paste p.o. (1 tube)	CABC's O ₂ V/S Blood Glucose Determination IF intact gag and adequate mental status: Glucose Paste po (1 tube)
EMT - I	EMT - I
IV - D50% 25 - 50 G IV May repeat once in 5 minutes if symptoms not resolved	IV Broselow Tape IF blood glucose is below 80 mg/dl (40 mg/dl for infant < 1 month old): - D25% 0.5 G/kg (2 ml/kg) IV for infants < 10 kg - D50% 0.5 G/kg (1.0 ml/kg) IV for children > 10 kg
PARAMEDIC	PARAMEDIC
IF unclear history or suspicious of alcohol abuse or withdrawal, or malnutrition: Thiamine 100 mg IV or IM	ECG IF unable to obtain IV access: - Glucagon IM, 1 unit ECG IF unable to obtain IV access: Glucagon IM, 0.5 unit
MEDICAL CONTROL	MEDICAL CONTROL
Repeat D50% if continued evidence of hypoglycemia	Repeat D25% or D50% if continued evidence of hypoglycemia

NOTES:

Hypoglycemia is often mistaken for a CVA, or intoxication, or a psychiatric disorder. Always consider the possibility that the patient may be hypoglycemic, as unrecognized and untreated hypoglycemia may be fatal. Thiamine should always precede D50% in the alcohol abuse or malnourished patient. The risk of osmotic-induced or Wernicke's neuropathy is serious enough to warrant administration of thiamine to any patient in whom the EMS personnel suspect alcohol abuse.

Hypoglycemia is common in infants and children with a hypoxia or other stress. The blood glucose levels should be monitored and D50% or D25% 0.5 mg/kg administered if indicated. For the infant < 10 kg, dilute D50% with an equivalent quantity of NS to create D25%, yielding 0.25 Gm/ml.

HYPERGLYCEMIA

CRITERIA:

Blood Glucose of greater than 180 mg/dl **WITH** one of the following: Altered mentation, Tachypnea, Abdominal pain, Hypotension and tachycardia

ADULT	PEDI
EMT	EMT
CABC's	CABC's
O ₂	O ₂
V/S	V/S
Blood Glucose Determination	Blood Glucose Determination
EMT - I	EMT - I
IV 500 ml/hr	Broselow Tape
	IV infuse at 50 ml/kg/hr or greater
PARAMEDIC	PARAMEDIC
ECG	ECG
MEDICAL CONTROL	MEDICAL CONTROL
None	None

NOTES:

IV should be NS at 500 ml or greater per hour (50 ml/kg/hr or greater for pedis). If hypotensive run wide open and titrate to a systolic of 100 mm Hg or higher.

Hyperglycemia is often the first presentation of a previously undiagnosed diabetic. Consider DKA or non-ketotic hyperosmolarity even in a patient who denies a history of diabetes.

Hyperglycemia is usually associated with the three "polys":

- Polyphagia (excessive hunger)
- Polydipsia (excessive thirst)
- Polyuria (excessive urination)

Diabetic Ketoacidosis is usually associated with the following findings:

- Dehydration
- Kussmaul Respirations
- Acetone odor on breath

Hyperglycemia is often mistaken for alcohol intoxication, CVA, or drug intoxication. Always consider this possibility when assessing a patient with the initial presentation of one of these problems, as untreated hyperglycemia may be fatal.

DEHYDRATION/SEPSIS

CRITERIA:

Hypovolemia (compensated or uncompensated), **OR** Other signs/symptoms of dehydration, including any one of the following: Poor skin turgor, Little or no urine output, Dry mucous membranes **WITH** evidence of dehydration mechanism, including: Vomiting or diarrhea, Fever, Diminished oral intake **OR** evidence of sepsis, including: Fever, Recent wound surgery, Recent URI or UTI, Urinary catheter, Petechia or rash.

ADULT	PEDI
EMT	EMT
CABC's O ₂ V/S Blood Glucose Determination IF BG below 80 mg/dl, treat per hypoglycemia protocol	CABC's O ₂ V/S Blood Glucose Determination IF BG below 80 mg/dl (40 mg/dl for infants) treat per hypoglycemia protocol
EMT - I	EMT - I
IV: Fluid challenge 250 - 500 ml May repeat q 5 min if still symptomatic	Broselow Tape IV: Fluid challenge 20 ml/kg (10 ml/kg for infants) May repeat q 5 min if still symptomatic
PARAMEDIC	PARAMEDIC
ECG IF hypotension refractory to 500 – 1000 ml IV fluid or continued fluid contraindicated: - Dopamine infusion 5 - 20 mcg/kg/min	ECG IF hypotension refractory to fluid or continued fluid contraindicated: - Epinephrine infusion 0.1 - 1.0 mcg/kg/min IF hypotension refractory to epinephrine: - Dopamine infusion 5 - 20 mcg/kg/min
MEDICAL CONTROL	MEDICAL CONTROL
None	None

NOTES:

Breath sounds and vital signs (and indicators of perfusion, such as capillary refill and mental status) should be evaluated before and after each fluid bolus. Stop fluid administration if pulmonary edema is detected and contact OLMC for further direction.

Endpoints for fluid administration:

- A systolic BP indicating normotension **WITH** a normal heart rate, **OR**
- Improved peripheral perfusion as evidenced by a normal capillary refill, strong peripheral pulses, and tears/urine production, **OR**
- Any auscultated evidence of pulmonary edema.

Septic shock carries a very high morbidity and mortality rate, and must be recognized by the EMS personnel as a serious illness. Sepsis produces hypoperfusion in three ways: fever causing dehydration, bacteria causing vasodilation, and exotoxins causing increased vascular permeability.

MULTI-SYSTEM TRAUMA

CRITERIA:

Injury to the chest, abdomen, pelvis, or extremities with evidence of significant possible injury
OR Multiple soft-tissue or musculoskeletal injuries with evidence of compensated or uncompensated shock

ADULT EMT

CABC's

O₂

V/S

TRANSPORT NOW

Complete secondary survey

EMT - I

Intubate if GCS < 8

IF pneumothorax suspected:

- [Needle chest decompression](#)

IV - infusion rate to maintain systolic BP of 90 mmHg

PARAMEDIC

ECG

MEDICAL CONTROL

None

PEDI EMT

CABC's

O₂

V/S

TRANSPORT NOW

Complete secondary survey

EMT - I

Intubate if GCS < 8

IF pneumothorax suspected:

- [Needle chest decompression](#)

IV - infusion rate to maintain systolic BP of 70 + (2 X age) mmHg

PARAMEDIC

ECG

MEDICAL CONTROL

None

NOTES:

Findings or complaints related to the chest, abdomen, or pelvis must elicit an aggressive response, as these injuries are associated with high morbidity. This is especially true in the elderly patient. Tachycardia in the normotensive trauma patient *must* be considered to represent compensated shock. Hypotension will not be seen until late in the shock cycle.

Airway management and oxygenation must be aggressive. If the patient can be intubated, they should be. Always assist ventilations with the BVM unless the patient's respiratory rate and tidal volume are good, then use high flow oxygen, via NRB mask. Continual re-assessment of the airway and ventilatory status is imperative.

TRANSPORT IS TREATMENT in the trauma patient and every effort should be made to keep scene times under **10** minutes. A repeat secondary exam, fracture immobilization, and vital signs q 5 minutes should be done enroute.

Spinal precautions influence all aspects of treatment in the trauma patient. Always use airway, ventilation, intubation, assessment, and movement techniques which minimize or eliminate potential aggravation of spinal injury.

Tension pneumothorax should also be suspected in the unconscious trauma patient in whom there is unusually high resistance to BVM ventilation. Rapid needle chest decompression is crucial.

BURNS

CRITERIA:

Tissue injury from direct contact with heat source, chemical reaction, inhalation, or electrical/lightning contact

ADULT	PEDI
EMT	EMT
Remove the burn source CABC's O ₂ V/S TRANSPORT AS SOON AS POSSIBLE (TO BURN CENTER IF NEEDED) Treat underlying injuries: IF < 10% BSA: Cool burns with sterile saline and cover with dry, sterile dressings IF > 10% BSA: Dress burns with dry, sterile burn sheet Remove loose clothing and jewelry	Remove the burn source CABC's O ₂ V/S TRANSPORT AS SOON AS POSSIBLE (TO BURN CENTER IF NEEDED) Treat underlying injuries: IF < 10% BSA: Cool burns with sterile saline and cover with dry, sterile dressings IF > 10% BSA: Dress burns with dry, sterile burn sheet Remove loose clothing and jewelry
EMT - I	EMT - I
IF indicated: Surgical airway or Intubation IV: Use Parkland Burn Formula unless hypotensive; if hypotensive, fluid resuscitation	IF indicated: Surgical airway or Intubation IV: Use Parkland Burn Formula unless hypotensive; if hypotensive, fluid resuscitation
PARAMEDIC	PARAMEDIC
ECG IF not inhalation or respiratory burns: - Morphine Sulphate 2 - 20 mg slow IV for severe pain - Promethazine 6.25 - 12.5 mg IV for severe nausea/vomiting May repeat once in 15 minutes if no relief	ECG IF not inhalation or respiratory burns: - Morphine Sulphate 0.1-0.2 mg/kg IM or SQ for pain - Morphine Sulphate 0.05-0.25 mg/kg IV Max. single dose of 2.0 mg
MEDICAL CONTROL	MEDICAL CONTROL
None	None

NOTES:

The removal of victims from the heat source takes priority over all other treatments.

Ventilation injuries, if severe, should be treated with tracheal intubation (the nasotracheal route is preferred) and mechanical ventilation.

Parkland Burn Formula: (IV fluids for first 8 hours) – Use [Rule of 9's](#) to calculate BSA

$$\frac{(\% \text{ Burn Area}) \times (\text{Pt. Weight. in Kg})}{4} = \text{cc/hr}$$

NOTE: This formula does not apply to patients in shock. The patient in shock needs more aggressive IV fluid replacement and should be treated accordingly.

Absolute indications for intubation:

- Rapid, shallow ventilation with tachypnea of 30-40 breaths/min AND decreased mental status.
- Respiratory rate of < 8-10 breaths/min.
- Mechanical airway obstruction from trauma, edema, or laryngospasm.
- Unconsciousness.

Relative indications for intubation:

- History of an enclosed space explosion or fire.
- Singed nasal hairs or oral mucosa.
- Erythema of the palate, soot in the mouth, larynx or sputum.
- Edema associated with a burn of the face or neck.
- Signs of respiratory distress such as nasal flaring, respiratory crowing or stridor, anxiety, agitation, or combativeness.

Consider use of Positive End Expiratory Pressure (PEEP) valve on the BVM to ventilate burn patients with inhalation injuries. See [Positive End Expiratory Pressure](#) procedure.

Wound Care: The object of wound care in the burn patient is to prevent further damage and infection. Remove all clothing around the burn, but do not pull any clothing that is stuck to the wound.

DO NOT apply ointment or solutions to the wound. Cooling with sterile saline is appropriate for small (< 10% BSA burns). Saline should *not* be used on larger burns. *All* burns should be covered with dry, sterile dressings.

TIME IS OF THE ESSENCE!

Burns requiring a burn facility are as follows:

- Partial thickness burns > 10% BSA
- Burns that involve the face, hands, feet, genitalia, perineum, or major joints
- Third degree burns in any age group
- Electrical burns, including lightning injury
- Chemical injury
- Inhalation injury
- Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality
- Any patient with burns and concomitant trauma (such as fractures)

Morphine is the drug of choice for analgesia in burn patients. Morphine should be used with caution as it can cause vasodilation and respiratory depression which can be dangerous if shock or respiratory problems are present. The use of morphine should be determined by the patient's overall condition, not just the amount of pain.

CERVICAL SPINE IMMOBILIZATION

CRITERIA:

Suspected injury to the cervical spine

Mechanism of injury with potential to injure the cervical spine

EMT

CABC's

Manual immobilization of cervical spine until cleared or immobilized

IF ANY OF THE FOLLOWING ARE FOUND, IMMOBILIZE THE CERVICAL SPINE

- Patient is not fully oriented to person, place, time and event*
- Neurological deficits/abnormalities*
- Drug or alcohol use present or suspected*
- Other severe or painful (distracting) injuries present*
- Spinal tenderness or deformity present*

Consider immobilization if:

- Patient reports neck pain
- Language barrier (unable to communicate directly with patient)
- Significant mechanism of injury exists
- Loss of consciousness observed or reported
- Patient requests immobilization

IF None of the above situations are present, assess for:

- Pain with active range of motion of neck

IF None of the above are found, cervical spine immobilization is not required

EMT - I

PARAMEDIC

MEDICAL CONTROL

None

NOTES:

This algorithm provides a mechanism for EMS personnel to determine the need for cervical spine immobilization of trauma patients. All of the conditions listed in the protocol must be examined and/or obtained by history. If any of the situations are encountered, the cervical spine should be immobilized. If none of the situations are encountered, the patient does not require immobilization. All of the information must be documented as pertinent negatives. If there is any question of whether the patient meets all of the criteria or there is other cause to suspect an injury, the patient should be immobilized. The first five criteria alone (*) will capture in excess of 99% of suspected cervical spine injuries.

The patient's cervical spine should be manually immobilized during this assessment.

The patient must be conscious, fully oriented and cooperative to complete this assessment. If the patient is not oriented to person, place, time and event, or if the patient is not cooperative, the patient should be immobilized.

If EMS personnel are not fluent in the non-English speaking patient's language, the patient history cannot be fully assessed. Any language barrier which would cause the patient and EMS personnel to be unable to directly communicate with each other is cause for the trauma patient to be immobilized.

Any loss of consciousness, whether observed by EMS or reported by the patient or bystanders, is cause to immobilize the trauma patient.

Pulse, motor and sensory function should be intact in all extremities.

Any reported, suspected or observed use of drugs or alcoholic beverages by the patient will impair their ability to report pain and may mask an injury. Severe or painful injuries will also impair the patient's ability to notice neck pain. In either of these cases the patient should be immobilized.

The patient should be directly asked if they have any neck pain. The neck should be palpated by EMS personnel to note any point tenderness or deformity. If pain, any tenderness or deformity, are found the patient should be immobilized.

If all of the findings are negative to this point, ask the patient to slowly flex and rotate their head. The patient should be asked if there is any pain with this motion. The report of any pain on movement should result in immobilization of the cervical spine.

METROCREST MEDICAL SERVICES

PROCEDURES,

REFERENCES,

and **APPENDIX**

ADENOSINE ADMINISTRATION

CRITERIA:

SVT or undifferentiated tachycardia as specified in the protocols.

CONTRAINDICATIONS:

Sick-sinus syndrome (except in the presence of a functioning artificial pacemaker)
Second or third degree heart block

PARAMEDIC

Administration of adenosine as per the specific protocol

MEDICAL CONTROL

None

EQUIPMENT:

- A total of 30 mg (5 vials) of adenosine.
- Two 3 cc syringes, with needles.
- Two 5 cc (or 10 cc) syringes, with needles.
- 3 10 cc syringes, with needles.
- IV catheters (over-the-needle type). Use largest bore practical.
- Equipment and supplies for ECG monitoring.
- 18 ga syringe needle.
- Alcohol or povidone/iodine preps.
- Injection lock.
- Sterile normal saline, 2 cc.
- 4x4's.
- Oxygen
- Bandaid, tape, or commercial securing device ("Venigaurd")
- IV fluid bag of NS.
- Volume administration set (10-12 gtts/ml).
- Tourniquet (BP cuff may be used instead).

PROCEDURE:

- 1) Ensure that patient is on ECG monitor and is receiving O₂.
- 2) Verify cardiac rhythm and patient status indicating adenosine administration.
- 3) If possible, establish two IV's (see appropriate procedures):
 - a. One as an NS at TKO.
 - b. One as an injection lock, no more distal than the antecubital fossa.
 - c. If unable to establish two IV's, establish an injection lock at a proximal site. Set up NS bag and tubing with piggyback adapter on end of tubing. Be prepared to attach to injection lock after adenosine administration if a fluid bolus is needed.
 - d. If due to a needleless system compatibility the injection lock will not allow two needles to be inserted into the lock simultaneously, the adenosine may be administered through an IV injection port closest to the patient and a **20 cc** flush should be given immediately after from the more distal port.
- 4) Draw up initial dose of adenosine in 3 cc syringe.
- 5) Draw up 10 cc of IV fluid in another syringe.
- 6) Begin continuous recording of ECG.
- 7) Prepare injection lock with alcohol or povidone/iodine.
- 8) Insert both needles attached to the syringes into the injection lock.
- 9) **RAPIDLY** push initial dose of adenosine through injection lock. Hold down the plunger of the other syringe while pushing the adenosine.
- 10) **IMMEDIATELY** follow with rapid injection of 10 cc of IV fluid from syringe. Hold down the plunger of the other syringe while pushing the flush.
- 11) Observe rhythm, while preparing second dose of adenosine and another 10 cc syringe of IV fluid.
- 12) If no conversion in exactly two minutes, repeat steps #7-10.
- 13) Observe rhythm while preparing third dose of adenosine and another 10 cc syringe of IV fluid.
- 14) If no conversion in two minutes after second dose, repeat steps #7-10.
- 15) If the patient becomes hypotensive, support with positioning and an IV fluid bolus of NS.
- 16) Record ECG for entire medication administration sequence.
- 17) Re-evaluate vital signs and patient status after either rhythm

CPAP (CONTINUOUS POSITIVE AIRWAY PRESSURE)

CRITERIA:

Respiratory insufficiency in the Pulmonary Edema, Asthma, COPD, CO Poisoning, or Near Drowning patient.

CONTRAINDICATIONS:

Respiratory Arrest/Agonal Respirations
Unconscious Patients (GCS < 10)
Cardiogenic Shock
Facial Trauma or Facial Burns
Pneumothorax
Pneumonia
Use with caution in bariatric patients

SIDE EFFECTS:

Gastric Distention
Reduced Cardiac Output
Hypoventilation
Pulmonary Barotrauma
Fluid Retention

EMT - I

Administration of CPAP as per the specific protocol:
10 cmH₂O for Pulmonary Edema
5 cm H₂O for all other conditions

PARAMEDIC

MEDICAL CONTROL

None

EQUIPMENT:

CPAP device with patient administration circuit
Oxygen source
IF nebulizing medication through the CPAP circuit:
Nebulizer
Albuterol
Adapter, 22mm double female
Second oxygen source

PROCEDURE:

- 1) Determine CPAP pressure needed to treat patients condition and start the oxygen flow:
 - a. 25 lpm provides 10 cmH₂O
 - b. 15 lpm provides 5 cmH₂O
- 2) Connect the tubing from the CPAP to the oxygen regulator
- 3) Start the CPAP and connect the mask
- 4) If nebulized medication is indicated to treat the patient:
 - a. Assemble the nebulizer and fill with medication
 - b. Insert the T-bar of the nebulizer between the mask and the CPAP valve, using the 22mm double female adapter if necessary
 - c. Start the oxygen flow into the nebulizer at 4-6 lpm (a second oxygen source will be required)
- 5) Attach the head strap into the hook rings on the side of the mask
- 6) Explain to the patient how the CPAP will help their breathing. Verbal coaching will help the patient through the procedure.
- 7) Gently hold the mask to the patients face insuring a good face/mask seal. You may also allow the patient to hold the mask to their face if they can.
- 8) Move the head strap around the patient's head. Insure that the round disk on the head strap is located on the crown of the patient's head. Attach the head strap on the hook rings.
- 9) Check around the mask for any leaks.
- 10) Adjust the mask and/or head strap accordingly to ensure the patient's comfort.
- 11) Monitor patient's vital signs q 5 minutes. Watch SpO₂ and ETCO₂ for improvements. ETCO₂ can be monitored by either nasal cannula or in line adapter.

ELECTROCARDIOGRAM

CRITERIA:

Any patient on whom ALS interventions are performed

Any patient who complains of:

- Possible myocardial ischemia symptoms (chest pain, etc.)
- Shortness of breath
- Syncope or dizziness
- Nausea or vomiting.

Any patient who displays:

- Tachycardia
- Hypotension
- Altered mental status
- Convulsion or syncope, including prior to EMS arrival.

A *12 lead ECG* **MUST** be obtained on all stable patients with signs or symptoms suspicious of cardiac ischemia or infarct. “Stable” cardiac ischemia patients are defined as patients in whom the 12 lead ECG will not result in a delay (that might adversely affect the patient’s outcome) in the provision of other urgent or definitive therapies.

A *12 lead ECG* **MUST** also be obtained on stable patients with an undifferentiated tachycardia (as defined in the tachycardia protocols) in rhythms thought to be VT or SVT.

Any other patient at the paramedic's discretion.

CONTRAINDICATIONS:

None

PARAMEDIC

Obtaining and interpreting ECG, including 12 lead

MEDICAL CONTROL

None

EQUIPMENT:

- ECG monitor
- Patient cables (electrodes)
- Monitoring electrode patches

PROCEDURE:

Standard ECG Monitoring:

- 1) Turn on monitor and attach patient cables to monitor as per manufacturer's instructions.
- 2) Apply electrode patches to patient. If at all possible, apply to clean, dry skin. Electrode patches are to be placed as follows:
 - a. Right arm in the mid-humerus area, either anteriorly or laterally (or distal right clavicle area).
 - b. Left arm in the mid-humerus area, either anteriorly or laterally (or distal left clavicle area).
 - c. Left leg, anywhere between the hip and the lower calf, laterally (or left chest, midaxillary, below the 12th rib).
- 3) Attach the patient cables to the electrode patches.
- 4) Select the desired lead (I, II, or III).
- 5) Record a strip of the ECG of at least 12 seconds duration. Record any changes in rhythm or any significant changes in rate. Record "pre" and "post" ECG strips before and after any intervention that will affect the cardiac rhythm or rate (medications, electrical therapy, etc.).
- 6) If using a machine with a memory function, be sure to record or otherwise store the summary or memory of the patient contact prior to disabling the function.

12 Lead ECG:

12 LEAD ECG WILL BE PERFORMED AS PER THE MANUFACTURER'S INSTRUCTIONS.

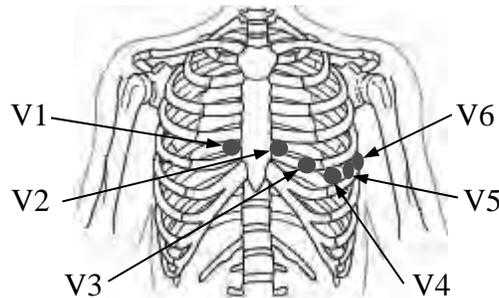
Electrode Placement for the 12 Lead ECG:

L imb Leads

- The four limb leads should be placed in the most distal position practical. The preferred location is the anterior wrists and medial ankles. Burns, amputations, and other injuries may dictate a more proximal location. They should be at least past mid-shaft humerus and mid-shaft femur.

C hest/Precordial Leads

- V1 should be placed in the fourth intercostal space on the right side of the sternum just next to the sternal border.
- V2 should be placed in the fourth intercostal space on the left side of the sternum just next to the sternal border.
- V3 should be placed directly between V2 and V4.
- V4 should be placed in the midclavicular line in the fifth intercostal space on the left side of the chest.
- V5 should be placed directly between V4 and V6.
- V6 should be placed in the anterior axillary line level with V5.



ECG changes consistent with myocardial infarction, injury, or ischemia:
 ST segment elevation of 1 mm or more in 2 contiguous limb leads or 2 mm or more in 2 contiguous precordial leads:

Ischemia: T-wave inversion or ST depression

Injury: ST segment elevation or depression

Infarct/Necrosis: pathological Q waves

- Anterior: V1 – V4
- Inferior: II, III, aVF
- Lateral: I, aVL, V5, V6
- Posterior: ST depression of precordial leads V1 – V4 and abnormal R wave progression (prominent R wave in V1 and V2)
- New bundle branch block
- Right ventricular MI: ST elevation of 1 mm or more in 2 inferior leads (II, III and aVF) and 2 mm or more elevation in V4R.

If using a monitor that provides a computerized interpretation, that interpretation may be used to assist the paramedic in his/her clinical decision making. The Paramedic must realize that the computer interpretation is not always correct.

The computerized interpretation may be relayed to the Medical Control physician and/or the receiving facility's ED physician. However, the relay of this information **MUST** be accompanied by a statement that clearly indicates that the interpretation is that of the machine's program.

The Standard 12 Lead Layout and the Views Obtained:

I <i>Lateral Wall</i>	aVR Not Used Interior Wall	V1 Anterior Wall Septal Wall	V4 Anterior Wall
II <u>Inferior Wall</u>	aVL <i>Lateral Wall</i>	V2 Anterior Wall Septal Wall	V5 <i>Lateral Wall</i>
III <u>Inferior Wall</u>	aVF <u>Inferior Wall</u>	V3 Anterior Wall	V6 <i>Lateral Wall</i>

Patients at Risk for CHB or Sudden Death:

Patients with multiple blocks are at significant risk for Complete Heart Block, bradycardias, and VF. If you say “block” two or more times in interpreting the ECG the patient is at severe risk. This includes:

- Bundle Branch Blocks (wide QRS)
- Hemifascicle Blocks (evidenced by axis deviation outside then norm of –30 to 90)
- AV Blocks

The machine interpretation will say ***Bifasicular Block***

Patients with bifascicular block who are having chest pain should have Combo pads placed on them; be prepared to pace or defibrillate and NOT use Lidocaine.
 Realize that up to 2/3 of the ventricular conduction may be blocked in a patient with a bifascicular block.

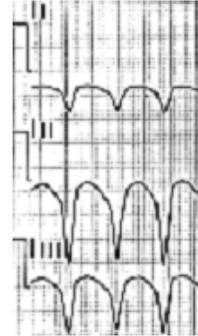
Rhythm Differentiation: VT vs. SVT:

Three quick things to look for to determine if a wide complex tachycardia is VT:

First, look at the axis, either on the printout or by looking at leads I, II, and III:

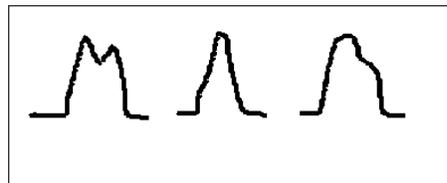
Extreme Right Axis Deviation + Upright complex in V1=VT

Leads I, II, and III will all be predominantly negative, V1 positive.
 QRS axis -90 to -180 degrees



Second, examine lead V1:

If V1 is upright
 Look for “big mountain-little mountain”
 Single upright peak
 “Fire Helmet”

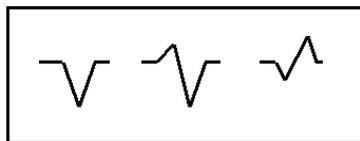


If V1 is negative
 Fat R wave or slur or notch on the downstroke = VT



Third, examine lead V6:

Any negative complex in V6 = VT



If you find any of these three things in a wide complex tachycardia, treat as V Tach

ESOPHAGEAL AIRWAY

CRITERIA: Unconscious adult patients with no gag reflex in whom endotracheal intubation cannot be immediately or easily obtained.

CONTRAINDICATIONS:

Height less than 4' or greater than 6'7"
Esophageal disease or injury
Cirrhosis of the liver or alcoholism
Ingestion of caustic substance

EMT

Intubation with the King LTS-D airway

EMT - I

PARAMEDIC

MEDICAL CONTROL

None

EQUIPMENT:

Appropriate size King LTS-D airway
BVM, complete
Water soluble lubricant
Suction equipment
Stethoscope
Oxygen

PROCEDURE: KING LTS-D

- 1) Provide or maintain airway and oxygenation with basic methods.
- 2) Prepare and assemble equipment. Select the proper size King LTS-D based on the patients height:
 - Size 3 Yellow: 4' to 5'
 - Size 4 Red: 5' to 6'
 - Size 5 Purple: 6'+
- 3) Test cuff inflation by injecting the maximum recommended volume of air into the cuff.
- 4) Apply a water-based lubricant to the beveled distal tip and posterior aspect of the tube.
- 5) Hyperventilate/preoxygenate patient for 30 seconds.
- 4) Remove mask and oral airway.
- 5) Ensure that patient's head is in a neutral or "sniffing" position.

- 6) Hold the KING LT(S)-D at the connector with dominant hand. With nondominant hand, hold mouth open and apply chin lift unless contraindicated by C-spine precautions or patient position.
- 7) With the KING LT(S)-D rotated laterally 45-90° such that the blue orientation line is touching the corner of the mouth, introduce tip into mouth and advance behind base of tongue. Never force the tube into position.
- 8) As tube tip passes under tongue, rotate tube back to midline (blue orientation line faces chin).
- 9) Without exerting excessive force, advance KING LT(S)-D until base of connector aligns with teeth or gums.
- 10) Fully inflate cuffs using the maximum volume of the syringe included in the kit.
- 11) Attach the BVM to the 15 mm connector of the KING LT(S)-D. While gently bagging the patient to assess ventilation, simultaneously withdraw the airway until ventilation is easy and free flowing (large tidal volume with minimal airway pressure).
- 12) Confirm proper position by auscultation, chest movement and verification of capnography.
- 13) Readjust cuff inflation to 60 cm H₂O (or to just seal volume).
- 14) Secure the device and place a cervical collar on the patient.
- 15) The gastric access lumen allows the insertion of up to a 18 Fr diameter gastric tube into the esophagus and stomach (PARAMEDIC providers). Lubricate gastric tube prior to insertion.

EXTERNAL CARDIAC PACING (TCP)

CRITERIA:

Bradycardic and agonal dysrhythmias that result in insufficient perfusion as evidenced by the symptoms of shock, hypotension or decreased level of consciousness.

CONTRAINDICATIONS:

None

PARAMEDIC

Midazolam 0.05 - 0.1 mg/kg IV (max dose 2 mg for pediatric patients) for anxiety/pain if patient's mental status warrants sedation

Initiation of external pacing

MEDICAL CONTROL

None

EQUIPMENT:

- Cardiac monitor/defibrillator with pacing capability.
- ECG monitoring supplies and equipment.
- Pacing pads, 1 set.
- Pacing lead wires, 1 set.
- Small scissors or razor.

PROCEDURE:

- 1) Apply anterior adhesive electrode on right side of sternum. If possible place pads on clean dry skin. If necessary, shave or trim hair.
- 2) Place posterior electrode on the left side of the chest, midaxillary.

NOTE: Anterior/posterior placement of electrodes may be used on pediatric patients if chest size is not adequate for anterior/lateral placement. Anterior/posterior placement is not recommended for adults.

- 3) Attach the lead wires to the electrodes as prescribed by the manufacturer.
- 4) Turn pacer on. DO NOT start current flow yet.
- 5) Set pacer rate at 80 bpm.
- 6) Start pacer current.
- 7) Increase milliamp setting by 20 mA (or largest increment available) until electrical capture is obtained, or up to the maximum energy available from the device.

NOTE: *Electrical capture* is usually evident by a wide QRS and tall, broad T-waves. In some patients it may be less obvious, noted only by a change in QRS morphology.

- 8) *Mechanical capture* may be evident by a palpable pulse, rise in blood pressure, improved level of consciousness, and improved skin color/temperature.
- 9) Once electrical capture is obtained begin decreasing Ma by the smallest increment available until capture is lost.
- 10) Then increase mA by small increments until electrical capture is regained. This will be the electrical or stimulation threshold (the minimum level of electrical energy needed to consistently depolarize the heart muscle).
- 11) Check for a pulse to determine the presence of mechanical capture.
- 12) If there is electrical capture but not mechanical capture, increase the *rate* only, up to a maximum of 120. **DO NOT increase the energy if electrical capture is achieved.**
- 13) If no response is obtained from maximum pacing output at a rate from 80 - 120, interrupt pacing and continue with the appropriate cardiac protocol. Intermittently check for possible capture using maximum pacer setting.
- 14) If mechanical capture is obtained, interrupt pacing every 2-3 minutes to check for return of spontaneous pulse for 5-10 seconds.
- 15) Documentation:
 - a. Date and time pacing initiated
 - b. Baseline and pacing rhythm strips
 - c. Current required to obtain capture
 - d. Pacing rate
 - e. Evaluation of patient's response to pacing, in terms of electrical and/or mechanical response if applicable.
 - f. Date and time pacing terminated.

EXTERNAL DEFIBRILLATION

CRITERIA:

- Pulseless/apneic patient
- V-fib or V-tach on ECG

CONTRAINDICATIONS:

- Dysrhythmias other than VF or VT

ADULT

EMT

Attach AED, analyze rhythm and defibrillate per AED's [protocol](#)

PARAMEDIC

External defibrillation in VF and pulseless VT using ADULT energy levels appropriate to your monitor/defibrillator (see table below)

MEDICAL CONTROL

None

PEDI

EMT

Attach AED, use Pedi setting if available, and defibrillate per AED's [protocol](#)

PARAMEDIC

Defibrillate at 2J/kg, repeat at 4 J/kg as needed per [protocol](#)

MEDICAL CONTROL

None

EQUIPMENT:

- ECG monitor/defibrillator
- Defibrillation pads
- ECG electrodes
- ECG monitor leads

Adult Defibrillation Energy Protocol	1 st Defibrillation	2 nd Defibrillation	3 rd and subsequent defibrillations
Monophasic (all brands)	360 J	360 J	360 J
Medtronic biphasic	200 J	300 J	360 J
Phillips biphasic	150 J	150 J	150 J
Zoll biphasic	120 J	150 J	200 J

PROCEDURE:

- 1) **IF** patient is unconscious, *immediately* determine airway, breathing, and circulatory status using "CABC" procedure.
- 2) **IF** patient is pulseless *immediately* initiate CPR while attaching monitoring electrodes or pads and determining ECG rhythm.
- 3) **IF** ECG reveals VF or VT, apply pads if not already in place.
- 4) Charge defibrillator to device appropriate setting (see above).
- 5) Stop CPR. Clear all other responders from patient contact.
- 6) Deliver shock.
- 7) Immediately resume CPR without rhythm or pulse check.
- 8) Repeat rhythm check and defibrillation approximately every 5 cycles of CPR (~2 mins)
- 9) Continue therapies as directed in appropriate Cardiac Arrest protocol.
- 10) If patient's rhythm should change at any point, move to the appropriate ALS protocol.
- 11) If patient should develop a spontaneous pulse, move to "[Post Resuscitation Management](#)".

EXTERNAL JUGULAR IV

CRITERIA:

As initial, primary venous access or secondary access in any critical patient (unconscious or otherwise at risk for imminent death)

CONTRAINDICATIONS:

None

- DO NOT compromise c-spine while establishing EJ IV.

EMT - I

Establishment of external jugular IV.

MEDICAL CONTROL

None

EQUIPMENT:

- IV catheter of appropriate gauge (usually 14 or 16 adult, 18 or 20 pedi)
- Alcohol or povidone/iodine preps
- 4x4's
- Bandaid and tape or commercial securing device ("Veniguard", "Opsite", etc.)
- IV fluid
- Minidrip or volume administration set (60 gtt/ml or 10-12 gtts/ml) as indicated
- 10 cc syringe

PROCEDURE:

- 1) Select and prepare equipment. Attach 10 cc syringe to hub of catheter/needle to assist in identification of placement in patients with low or no cardiac output.
- 2) Select IV fluid. Check for expiration date and visually examine for contamination.
- 3) Connect administration set and extension set.
- 4) Clear air from IV tubing. Don appropriate personal protective (infection control) items.
- 5) Identify external jugular vein.
- 6) Cleanse site with alcohol.
- 7) Stabilize vein at site with distal (or cephalad) pressure.
- 8) Direct needle point caudally (toward chest). Pierce skin just *lateral* to vein.
- 9) Advance needle/catheter until needle enters lumen of vein (recognized by change in resistance and return of blood into catheter hub). In patients with low or no cardiac output, it may be necessary to aspirate with the syringe to confirm entry into the lumen.
- 10) Once the needle has entered the lumen, advance the catheter/needle assembly very slightly farther into the lumen. This ensures that the catheter has entered the vessel.
- 11) Stop advancing the needle. Advance the catheter off the needle and into the vein.
- 12) Withdraw needle from catheter. If needed, gentle pressure may be applied proximal to catheter to stop bleeding from catheter.
- 13) Attach IV tubing to catheter hub.
- 14) Open IV to wide open briefly, and check for good flow and lack of extravasation.
- 15) If IV patent, secure catheter/tubing with tape/bandaid or commercial device.
- 16) Set IV flow to desired rate.
- 17) Properly dispose of contaminated equipment/supplies.

INJECTION LOCKS

CRITERIA:

Injection locks may be used to secure venous access in any patient in whom:

- The EMS personnel do not anticipate the immediate need for administering IV medications or IV fluid to in the pre-hospital setting.
- The EMS crew has already secured a patent IV line for medications or fluid and simply desire a second IV site for "backup".
- The patient will be receiving Adenocard. In this situation, the EMS personnel must also establish a second IV, with large bore catheter, of NS.

CONTRAINDICATIONS:

None

EMT - I

Establishment of IV access with an injection lock

Placement of secondary access with an injection lock

MEDICAL CONTROL

None

EQUIPMENT:

- Angiocath of the appropriate gauge
- Alcohol preps
- Injection lock (catheter cap)
- 3 cc syringe
- Sterile normal saline, 2 cc
- Tape and bandaid or commercial securing device ("Venigaurd", "Opsite", etc.)

PROCEDURE:

- 1) Assemble, prepare equipment. Don appropriate personal protective (infection control) items.
- 2) Select, prepare for, and establish IV with angiocath in usual manner.
- 3) Once stylet is removed, attach injection lock to IV catheter.
- 4) Flush lock and catheter with 2-3 cc of normal saline.
- 5) If patent, secure IV catheter in usual manner.

EZ-IO INTRAOSSEOUS ACCESS

CRITERIA:

CRITICALLY ill or injured adult or pediatric patient requiring medication or fluids in whom IV access cannot be established in two attempts **OR** within 90 seconds;
May be used as initial vascular access site in the cardiac arrest patient

CONTRAINDICATIONS:

History of chronic bone disease or osteomyelitis
Tumor, infection, or joint replacement surgery at site (consider alternate site)
Fracture or trauma to site (exception: minor to moderate burns if no other IO site is available), previous unsuccessful attempt on the same bone (consider alternate site)
Inability to locate landmarks (edema) or excessive tissue at insertion site

ADULT

EMT - I

IO access into the proximal or distal tibia OR humerus

MEDICAL CONTROL

None

PEDI

EMT - I

IO access into the proximal or distal tibia

MEDICAL CONTROL

None

EQUIPMENT:

- EZ-IO Driver
- EZ-IO Needle Set appropriate for patient (pedi: 3-39 kg, adult: 40 kg or more; patients with excessive tissue: EZIO 45mm)
- Alcohol or povidone-iodine preps
- 10 cc syringe
- Tape
- Pressure Infusion Bag
- Lidocaine 2%
- Complete IV set up, including fluid, macrodrip tubing, and extension set

PROCEDURE:

1. Wear appropriate Body Substance Isolation Equipment.
2. Locate insertion site:
 - a. One finger width distal to the tibial tuberosity along the flat aspect of the medial tibia
 - b. Two finger widths proximal from the medial malleolus along the flat aspect of the tibia
 - c. Midshaft proximal humerus at the greater tubercle (adult only)
3. Prep the site with alcohol or povidine using aseptic techniques
4. Prepare the EZ-IO driver and needle set
5. Stabilize the leg/arm site and pull the skin taut over the site
6. Position the driver at the insertion site with the needle at a 90-degree angle to the bone.

7. Power the needle set through the skin until you feel the needle tip encounter the bone. Verify that you can still see the 5mm marking on the catheter (closest to the flange). If the mark is not visible, abandon the attempt as the needle will not be long enough to penetrate into the IO space. Restart the process with a longer needle if available.
8. Continue to insert the EZ-IO with a firm and steady pressure on the driver. Stop when the needle flange touches the skin or a sudden decrease in resistance is felt.
9. Remove the driver from the needle set while supporting the needle with one hand.
10. Remove the stylet from the catheter by rotating it counter-clockwise while grasping the hub firmly with the other hand. Dispose of stylet in sharps container.
11. Attach primed extension tubing to hub of catheter.
12. Conscious patients should now receive 40 mg Lidocaine 2% IO administered over 1 minute. Wait 2 minutes to allow anesthetic effect to begin before infusing additional fluid or flush.
13. Attach syringe with 10 cc of NS and flush. Do not aspirate.
14. Attach IV set to extension tubing and initiate infusion. Use pressure infuser bag to maintain adequate flow rate. Monitor for extravasation.
15. Secure tubing with “hinge tape” method. Consider splinting the extremity, leaving access to the IO insertion site and surrounding area to provide ability to monitor for extravasation. Do not apply a dressing around the IO device.
16. Apply the EZ-IO wristband to patient.

NOTES:

Flow rates with an IO will be slower than with an IV catheter. To ensure adequate infusion rates, always flush the needle forcefully with 10 cc's of NS prior to initiating an infusion and use a pressure infuser bag for continuous infusions.

If the patient is conscious, the infusion of fluids into the IO space can be extremely painful. Prior to IO fluid bolus on an alert patient, SLOWLY administer 40 mg of Lidocaine 2% through the EZ IO.

The device should be removed from the patient within 24 hours. Removal may be accomplished by attaching a luer lock syringe to the hub of the needle and rotating clock-wise while gently pulling the catheter up and out of the patient.

INTRAVENOUS ACCESS

CRITERIA:

Any patient requiring IV access for medication or fluid administration, either immediate or anticipated

As directed by specific protocol

CONTRAINDICATIONS:

Only as noted in specific protocols

EMT - I

Establishment of peripheral IV (see specific procedure for external jugular IV)

Administration of IV fluid as indicated in specific protocols.

MEDICAL CONTROL

None

EQUIPMENT:

- IV catheter (over-the-needle type) of desired gauge
- Alcohol or povidone/iodine preps
- 4x4's
- Bandaid and tape or commercial securing device ("Venigaurd", "Opsite", etc.)
- IV fluid bag of desired type
- Minidrip or volume administration set (60 gtt/ml or 10-12 gtt/ml) as indicated
- Tourniquet (BP cuff may be used instead)

PROCEDURE:

- 1) Select and prepare equipment. Don appropriate personal protective (infection control) items.
- 2) Select IV fluid. Check for expiration date and visually examine for contamination.
- 3) Connect administration set and extension set.
- 4) Clear air from IV tubing.
- 5) Apply constricting band. Confirm distal pulse after application. If using BP cuff, inflate cuff to **80%** of patient's systolic pressure
- 6) Select site below constricting band.
- 7) Clean area with alcohol prep.
- 8) Inspect catheter/needle assembly for defects.
- 9) Stabilize vein at site.
- 10) Pierce skin with needle/catheter, keeping bevel up.
- 11) Enter lumen of vein with needle, as evidenced by blood return into catheter hub.
- 12) Very slightly advance assembly to ensure that catheter tip has entered lumen.
- 13) Stabilize needle and advance catheter into vessel lumen.
- 14) Withdraw needle from catheter. If needed, gentle pressure may be applied proximal to catheter to stop bleeding from catheter.
- 15) Attach IV tubing to catheter hub. Remove constricting band.
- 16) Open IV to wide open briefly, and check for good flow and lack of extravasation.
- 17) If IV patent, secure catheter/tubing with tape/bandaid or commercial device.
- 18) Set IV flow to desired rate.
- 19) Properly dispose of contaminated equipment/supplies.

MUCOSAL ATOMIZATION DEVICE

CRITERIA:

Patient requires medications but IV access is not available or delayed

CONTRAINDICATIONS:

Epistaxis
Blocked nasal passages

PARAMEDIC

Administration of medication via IN route

Midazolam
Naloxone
Fentanyl

MEDICAL CONTROL

None

EQUIPMENT:

- Mucosal Atomization Device
- 3 ml syringe
- Needle
- Medication indicated for patient

PROCEDURE:

- 1) Assemble, prepare equipment. Don appropriate personal protective (infection control) items.
- 2) Inspect nares for blockage/bleeding or other condition that would preclude use of IN route.
- 3) Draw up dose of medication into syringe. Total volume of medication to be administered should not exceed 2 ml. Total volume per nostril should not be more than 1 ml.
- 4) Place MAD device securely on the tip of the syringe.
- 5) Insert MAD device into a nostril until the nostril is sealed (~1 to 2 cm).
- 6) Depress the plunger of the syringe forcefully until 1 ml of the medication has been given.
- 7) If necessary, repeat the procedure in the other nostril to administer the remainder of the medication.
- 8) Dispose of the syringe and device in a sharps container.

NASOGASTRIC TUBE INSERTION

CRITERIA:

- Cardio-pulmonary arrest with gastric distention
- Gastric distention secondary to near drowning
- Respiratory arrest/distress with assisted ventilations **AND** gastric distention
- Poisoning and/or overdose requiring immediate gastric emptying
- WITH** secure and patent airway

CONTRAINDICATIONS:

- Altered mentation **WITHOUT** secured airway

PARAMEDIC

- NG intubation in CPR
- Respiratory arrest/distress

MEDICAL CONTROL

- NG intubation in poisoning or overdose

EQUIPMENT:

- Nasogastric tube(s) of correct size
- 60 cc syringe, catheter-tip type
- Water soluble lubricant
- Sterile water
- 1/2 or 1 inch tape
- Suction equipment and supplies
- Stethoscope
- Oxygen

PROCEDURE:

- 1) Assemble, prepare equipment. Don appropriate personal protective (infection control) items.
- 2) Inspect nares. If unconscious, place a lubricated nasal trumpet (airway) in most dilated nare.
- 3) Measure, beginning with the tip of the NG tube at the navel, the distance from the navel to the earlobe and to the nare.
- 4) Mark this distance on the NG tube using a marker or a loop of tape.
- 5) Remove nasal airway, if placed. Place tip of lubricated NG tube into most dilated nare.
- 6) Advance tube into posterior pharynx. If patient is conscious, have him/her swallow while advancing tube through pharynx and into esophagus. Advance tube with each swallow.
- 7) If patient is unconscious, position patient's head in a neutral or flexed position while advancing tube through pharynx and into esophagus. If needed, visualization with the laryngoscope and manipulation of the NG tube with Magill forceps may be used.
- 8) If patient develops stridor or dyspnea, **STOP**. Remove tube, oxygenate patient, and attempt NG placement again.
- 9) Once tube is advanced to distance mark, stop and manually stabilize tube.
- 10) Attach syringe, aspirate for gastric contents.

- 11) After aspirating, auscultate over epigastrium while re-injecting aspirate.
- 12) Tube placement is confirmed by auscultating air or aspirate entering stomach. The presence of gastric contents on aspiration helps confirm placement, but its absence does not necessarily indicate improper placement.
- 13) Once placement is confirmed, secure tube with tape.
- 14) Attach to low-power suction. Turn suction off every 3 - 5 minutes.
- 15) If lavage is to be used, draw up sterile saline in the syringe and inject it into the NG tube. Attach tube to suction for 3 - 5 minutes or until all saline is recovered. Repeat this cycle as needed.
- 16) If PO medications are given via the NG tube, flush the tube with 30 ml of water after medication administration to flush tubing.

NOTE: In the pediatric patient nasogastric tube insertion may be traumatizing to the nares. In this case it is acceptable to insert the tube via the orogastric route. The procedure otherwise remains the same

NASOTRACHEAL INTUBATION

CRITERIA:

Any breathing patient requiring tracheal intubation (as in "Orotracheal Intubation" procedure) that cannot be intubated orally.

Reversible causes of AMS have been addressed (i.e. hypoglycemia, narcotic overdose, etc.)

CONTRAINDICATIONS:

Infants (< 1 year of age)

USE WITH CAUTION IN:

- Basilar skull fracture
- Severe maxillo-facial trauma
- Nasal fracture or deviated septum
- Young children

ADULT

EMT - I

Nasotracheal intubation

PARAMEDIC

IF needed to facilitate intubation:

- Lorazepam 2 mg IV

OR

- Midazolam 0.1 - 0.3 mg/kg IV

MEDICAL CONTROL

None

PEDI

EMT - I

Nasotracheal intubation (pt's > 1 year old)

PARAMEDIC

IF needed to facilitate intubation:

- Midazolam 0.05 - 0.1 mg/kg IV up to 2 mg

MEDICAL CONTROL

None

EQUIPMENT:

- Endotracheal tube(s) of appropriate size (usually 1 mm smaller than the size for oral intubation)
- Bag-valve-mask, complete
- 10 cc syringe
- Water-soluble lubricant
- Tape or commercial tube securing device
- Nasal airway of the appropriate size
- Nasal intubation "whistle" tip
- Stethoscope
- Suction equipment and supplies
- Oxygen
- ETCO₂ Detector

PROCEDURE:

- 1) Manually establish or secure airway. Pre-oxygenate and hyperventilate patient.
- 2) Assemble and prepare equipment. Lubricate ET tube, attach "whistle" tip.
- 3) While oxygenating, inspect nares.
- 4) Place nasal airway (lubricated) in most dilated or least obstructed nare. The airway will further dilate nare.

- 5) Position patient's head as appropriate (neutral if cervical spine precautions indicated, "sniffing" position otherwise).
- 6) Remove mask and nasal airway.
- 7) Place tip of ET tube into nare.
- 8) Advance tube through nare, keeping bevel to the *floor* of the nasal passage. Use a gentle twisting motion to help advance the tube. If resistance is met, retreat a short distance and advance again using gentle twisting. If persistent resistance is met, withdraw tube, reoxygenate, and try other nare.
- 9) Advance tube through pharynx and toward glottis. Listen for air movement at tip. As glottis is approached, air noise at tip should become more sharply defined.
- 10) At either inhalation or exhalation, advance tube into glottis. Adapter hub should seat near or against nare.
- 11) Listen for air at tip. If not present, withdraw and reattempt. If present, remove whistle tip.
- 12) Attach EID to tube adapter and confirm placement (bulb should quickly reinflate or syringe plunger should aspirate air freely).
- 13) Begin ventilating patient with BVM, reconfirm placement by auscultating over epigastrium **FIRST**, then bilaterally over anterior chest (use lateral chest in pedi patients). If placement confirmed, inflate cuff. Observe for ETCO₂ values and waveform.
- 14) Reposition tube or re-intubate patient as needed. Each attempt must be preceded by 30-60 seconds of oxygenation.
- 15) Secure tube.
- 16) RECONFIRM tube placement often using EID device, especially after moving patient or manipulating ET tube. Monitor ETCO₂ values and waveforms continuously to monitor tube placement.

NEBULIZED BRONCHODILATION

CRITERIA:

Dyspnea **WITH:**

- Evidence of bronchospasm (wheezes, silence), due to asthma or COPD, **AND**
- Adequate mental status and respiratory effort to inspire mist

CONTRAINDICATIONS:

CHF/Pulmonary Edema

Severely obtunded or unconscious patient

ADULT

EMT

Nebulized administration of **albuterol 2.5 mg**
May repeat continuously to a total of four doses if dyspnea not relieved

MEDICAL CONTROL

Administration of nebulized medications other than albuterol

PEDI

EMT

Nebulized administration of **albuterol 2.5 mg**
May repeat continuously to a total of four doses if dyspnea not relieved

MEDICAL CONTROL

Administration of nebulized medications other than albuterol

EQUIPMENT:

- Medication for nebulization
- Oxygen-driven nebulizer
- Oxygen

PROCEDURE:

- 1) Assemble, prepare equipment and medication. Don appropriate personal protective (infection control) items.
- 2) Explain procedure to patient.
- 3) If possible, encourage the patient to exhale as much as possible.
- 4) Place, or have the patient place, the mouthpiece in the patient's mouth OR direct the medication at patient's nose/mouth.
- 5) Have the patient inhale to his/her maximum volume.
- 6) If possible, have the patient hold his/her breath for 1 - 2 seconds, then slowly exhale.
- 7) Repeat the process until all the mist is gone.
- 8) **DISCONTINUE** therapy if:
 - a. The patient's heart rate increases by 20 beats/min or more from baseline.
 - b. Cardiac dysrhythmias appear (or worsen, if already present).
- 9) In some cases, the patient will be too dyspneic to follow these directions. This is not a contraindication to this procedure. Nebulized bronchodilation will generally still be effective as long as the patient is able to inspire the mist. Modify the procedure as needed to administer the medication to the anxious or extremely dyspneic patient.

NEEDLE CHEST DECOMPRESSION

CRITERIA:

Signs/symptoms of a tension pneumothorax

CONTRAINDICATIONS:

None

EMT - I

Needle chest decompression for traumatic tension pneumothorax

MEDICAL CONTROL

Needle chest decompression for non-traumatic tension pneumothorax

EQUIPMENT:

- Chest decompression kit, which includes:
 - 12, 14, or 16 ga over-the-needle catheters, length > 4.5 cm
 - Asherman Chest Seal
 - Number 10 scalpel
- Stethoscope
- ECG monitoring supplies and equipment
- Oxygen
- Appropriate ventilation equipment

PROCEDURE:

- 1) Ensure that patient is being ventilated. It is preferable that patient also have a patent IV in place and be on the ECG monitor.
- 2) Assemble, prepare equipment. Don appropriate personal protective (infection control) items.
- 3) Locate second intercostal space at mid-clavicular line on affected side of chest. Alternatively, the third space at mid-clavicular line may be used.
- 4) Prepare area with povidone-iodine.
- 5) Attach the syringe to the over-the-needle catheter.
- 6) At the selected location, make a small stab incision with the scalpel. Incise *only* through the dermis, superior to and longitudinally with the rib.
- 7) Insert the over-the-needle catheter assembly through the incision and into the chest, directing it just **over** third rib (mid-clavicular) or fourth rib (mid-axillary). Direct the assembly slightly caudally.
- 8) Once the pleural space is entered (recognized by a change in resistance and/or air entry into the syringe), advance catheter into space until the hub is flush with the skin.
- 9) Remove needle and syringe while manually stabilizing catheter.
- 10) Wipe around site with provided gauze. Remove backing. Apply Asherman Chest Seal.
- 11) Auscultate chest for improvement in breath sounds.
- 12) Contact Medical Control and advise them of procedure and results.
- 13) Monitor catheter/seal to insure continued correct functioning, and need for additional decompression.

OROTRACHEAL INTUBATION

CRITERIA:

Any patient requiring mechanical ventilation, PEEP, or airway protection

As directed in the specific protocols

Reversible causes of AMS have been addressed (i.e. hypoglycemia, narcotic overdose, etc.)

CONTRAINDICATIONS:

None

ADULT

EMT - I

Orotracheal intubation

PARAMEDIC

IF needed to facilitate intubation:

- Lorazepam 2 mg IV

OR

- Midazolam 0.1 - 0.3 mg/kg IV up to 20 mg

- Lidocaine 1.5 mg/kg 2-3 minutes before intubation if CVA or Head Injury

MEDICAL CONTROL

Additional midazolam beyond 20 mg or lorazepam beyond 8 mg

PEDI

EMT - I

Orotracheal intubation

PARAMEDIC

IF needed to facilitate intubation:

- Midazolam 0.05 - 0.1 mg/kg IV up to 2 mg

OR

Lorazepam 0.1 mg/kg IV, max single dose 2 mg

- Lidocaine 1.5 mg/kg 2-3 minutes before intubation if CVA or Head Injury

MEDICAL CONTROL

Additional midazolam or lorazepam beyond 4 mg

EQUIPMENT:

- Endotracheal tube(s) of appropriate size
- Stylet for ET tubes
- Laryngoscope handle and batteries
- Laryngoscope blades of the appropriate sizes and desired type
- Bag-valve-mask, complete
- 10 cc syringe
- Water-soluble lubricant
- Commercial tube securing device
- Oral airway of the appropriate size
- Stethoscope
- Suction equipment and supplies
- Oxygen
- ETCO₂ Detector
- Cervical collar

PROCEDURE:

- 1) Manually establish or secure airway. Pre-oxygenate, premedicate, and hyperventilate patient.
- 2) Assemble and prepare equipment.
- 3) Position patient's head as appropriate (neutral position with manual stabilization if cervical spine precautions indicated, "sniffing" position otherwise).
- 4) Remove mask and oral airway.
- 5) Insert laryngoscope blade, moving tongue to the left and lifting epiglottis. DO NOT apply pressure to teeth.
- 6) Visualize glottis and vocal cords.
- 7) Pass ET tube through pharynx and into glottis. Directly visualize passage of tube through cords.
- 8) Advance tube until cuff is just past cords. STOP advancing.
- 9) Manually stabilize/secure tube.
- 10) Attach EID to tube adapter and confirm placement (bulb should quickly reinflate or syringe plunger should aspirate air freely).
- 11) Begin ventilating patient with BVM, reconfirm placement by auscultating over epigastrium **FIRST**, then bilaterally over anterior chest (use lateral chest in pedi patients). Observe for ETCO₂ values and waveform.
- 12) Reposition tube or re-intubate patient as needed. Each attempt must be preceded by 30-60 seconds of oxygenation. Assess why the intubation failed before making an additional attempt and correct the issue (i.e. suction needed, positioning, etc.). If more than two attempts are unsuccessful, consider an esophageal airway device to manage the airway.
- 13) Once tube is confirmed to be in place, inflate cuff.
- 14) **REASSESS** tube placement. If still in correct position, place oral airway as a bite block and secure tube with a commercial tube securing device.
- 15) Place cervical collar on patient to minimize head movement and possibility of extubation.
- 16) **RECONFIRM** tube placement often, especially after moving patient or manipulating the ET tube. Monitor ETCO₂ values and waveforms continuously to monitor tube placement.
- 17) Ventilatory rate should be guided by ETCO₂ levels; normal range 35 – 45 mmHg.

PATIENT RESTRAINT

CRITERIA:

Patients in whom altered mental status or age (pediatric patients unable to comply with directions) require restraints for their own protection, the protection of EMS personnel, or to effect assessment, treatment and transport, **AND**,

Situations when lack of assessment, treatment or transport would likely result in harm to the patient, **AND** assessment, treatment or transport cannot be effected without restraints,

WITHOUT:

- Causing harm to the patient or EMS personnel, **OR**
- Being used in a punitive or unnecessary fashion.

ADULT

EMT

Physical Restraints

PARAMEDIC

Chemical Restraints:

- Midazolam 0.05 mg/kg IV, max dose 5 mg if IV access is established
- Midazolam 0.1 mg/kg IM/IN, max dose 10 mg, if no IV access

MEDICAL CONTROL

Additional midazolam or lorazepam

PEDI

EMT

Physical Restraints

PARAMEDIC

Chemical Restraints

- Midazolam 0.05 - 0.1 mg/kg IV up to 2 mg
- Midazolam 0.1 mg/kg IM/IN, max dose 5 mg, if no IV access

MEDICAL CONTROL

Additional midazolam or lorazepam

EQUIPMENT:

Physical Restraint:

- Minimum of three personnel trained in restraint procedure
- Triangle bandages, 4
- Backboard, KED, other device as indicated
- Ambulance stretcher

Chemical Restraint:

- Item for Physical Restraint, as above
- Midazolam or lorazepam
- Syringe with hypo needle for IM injection or blunt cannula for IV injection
- ETCO₂ monitor

PROCEDURE:

- Only triangle bandages, or commercial patient restraints may be used to physically restrain patients.
- All crew members must agree on the need before applying restraints.
- The biggest threat in both physical and chemical restraint is airway and/or ventilatory compromise. EMS personnel must continually monitor the restrained patient's airway and respiratory status via capnography.

- If it is likely that restraint of the patient will result in harm to EMS personnel, defer the initial control and restraint of the patient to law enforcement personnel. EMS will work in conjunction with law enforcement to ensure that the patient is safely and effectively restrained in a manner which will allow necessary medical assessment and treatment.
- Patients may only be restrained in one of the following two positions:
 - Supine on the cot or a backboard with the ankles and wrists tied independently to the cot frame (or backboard) with triangle bandages. Tie one hand above the patient's head, and one at waist level. Tie another triangle bandage (or cot strap) across the legs, above the knees. One additional triangle bandage may be tied across the patient's chest as long as it does not cause respiratory compromise.
 - Supine on the cot (not a backboard) ankles secured to cot frame and with the arms across the body, tied to the cot frame on the opposite side. Raise the head of the cot slightly so the arms are pulled securely across the chest. Make certain this position does not cause respiratory compromise.
- Patients will not be restrained in a prone position.

Physical Restraint:

- 1) Don appropriate PPE.
- 2) Ensure adequate manpower, at least three, preferably five, trained in restraint procedures.
- 3) Position personnel as follows:
 - a. One person is assigned to control each of the patient's extremities
 - b. One person remains in front of the patient to act as a decoy and keep the patients attention.
 - c. If available, one person should stay behind the patient to help control the patient's descent to the ground.
- 4) When personnel are in position and ready, they should approach the patient quietly and out of the patient's line of sight. The "decoy" should maintain communication and eye contact with the patient and continuously try to calm and distract the patient. All four rescuers assigned to the extremities should take the patient simultaneously, and lower the patient to the ground as smoothly and softly as possible.
- 5) Patients may be secured to the ambulance stretcher, a backboard or to another device as needed. In general, securing to the cot is the most appropriate for adults and large children. Small children may require a KED or papoose board.

Chemical Restraint

- For use when physical restraint is inadequate, or unsuccessful in achieving the objectives of restraint, or
- Physical restraint cannot be initiated or maintained safely and effectively without sedation.
- IV administration of the medication is preferred, but the patient's condition may require the medication be given IM or IN. Administer the medication and then allow it time to take effect.
- Closely monitor patients ventilatory and oxygenation status. ETCO₂ monitoring and ECG should be implemented as soon as possible and monitored constantly while the patient is restrained.
- Apply physical restraints as soon as possible.

Reasons and methods used for patient restraint must be fully documented.

POSITIVE END EXPIRATORY PRESSURE (PEEP)

CRITERIA:

Any patient with evidence of moderate to severe atelectasis, aspiration, or alveolar infiltrate, *especially:*

- Pulmonary edema
- Near drowning
- Smoke or fume inhalation with severe respiratory distress

CONTRAINDICATIONS:

None.

ADULT	PEDI
EMT - I	EMT - I
Provision of PEEP at 20 cm H ₂ O	Provision of PEEP at 10 cm H ₂ O
MEDICAL CONTROL	MEDICAL CONTROL
None	None

EQUIPMENT:

- PEEP valve, as approved by MMS
- BVM, complete
- Intubation equipment
- ECG monitoring equipment and supplies (Paramedic level providers)
- Oxygen

PROCEDURE:

- 1) ***ENDOTRACHEALLY INTUBATE PATIENT.***
- 2) Attach PEEP valve to end adapter of BVM.
- 3) Attach BVM to ET tube in usual manner.
- 4) Ventilate patient as usual.
- 5) PEEP may cause dysrhythmias, bradycardias, and/or changes in vital signs. Reassess vital signs at least q 5 minutes. Discontinue or decrease PEEP if significant adverse responses occur. Paramedic level providers should observe ECG rhythm closely.

SURGICAL AIRWAY

CRITERIA:

CRITICAL patient in whom a patent airway cannot be maintained or established by oro-pharyngeal or naso-pharyngeal airway, BVM, or oro- or naso-tracheal intubation, due to maxillo-facial trauma, inflammation or swelling of the airway, or other mechanism resulting in a *life-threatening* airway compromise.

CONTRAINDICATIONS:

An airway obtainable *by any other means*

EMT - I

Establishment of a surgical airway in the patient with complete obstruction.

MEDICAL CONTROL

Establishment of surgical airway in other settings (less than complete obstruction, epiglottitis, etc.)

EQUIPMENT:

- Rusch QuickTrach surgical airway kit; Adult 4 mm, Pedi 2 mm
- Suction equipment and supplies
- BVM, complete
- Stethoscope
- Oxygen

PROCEDURE: *Rusch QuickTrach*

- 1) Prepare, assemble equipment
- 2) If at all possible, hyperventilate patient
- 3) Locate landmarks
 - a. **Adult:** Locate the cricothyroid membrane. Place finger on thyroid cartilage (“Adam’s apple”) and move finger down into soft depression between thyroid cartilage and cricoid cartilage (next firm “bump”).
 - b. **Pediatric:** Locate the trachea, approximately 1-2 fingers width above the sternal notch.
- 4) Leave finger on site.
- 5) Stabilize tissue by applying finger pressure bilaterally to site with hand that is marking site.
- 6) Prepare the site with alcohol preps.
- 7) Hold the device and puncture the membrane (the trachea in pediatric patients) at a 90 angle.
- 8) Aspirate air with syringe. If air is present, the needle is in the trachea.
- 9) Rotate the device to a 60 angle (toward the head), and advance the QuickTrach until the plastic stopper is flush with the skin.
- 10) Remove the stopper and thread the device off the needle and into the trachea until the flange is flush with the skin. Carefully remove the needle and syringe.
- 11) Secure the cannula with the supplied Velcro strap.
- 12) Connect one end of the flexible tubing to the 15 mm connector on the device and the other end to the BVM.

- 13) Ventilate and confirm placement with auscultation and observation of chest wall movement.
- 14) Apply dressing (if bleeding) to site.
- 15) Contact Medical Control and advise physician of procedure and results.

VAGAL MANEUVERS

CRITERIA:

[Narrow Complex Tachycardia](#) as defined in the specific protocol

CONTRAINDICATIONS:

For Valsalva's Maneuver

- None

For Carotid Sinus Massage:

- Unequal carotid pulses
- Bruit to either carotid artery
- History of CVA
- History of carotid or neck surgery
- Patient greater than 50 years old

PARAMEDIC

Application of vagal maneuvers for Stable Supraventricular Tachycardia

MEDICAL CONTROL

None

EQUIPMENT:

- ECG monitor and monitoring supplies
- Equipment and supplies for IV

PROCEDURE:

For Valsalva's Maneuver:

- 1) Ensure that patient is on continuous ECG monitoring, is receiving O₂ and has a patent IV.
- 2) Reconfirm that patient is still in SVT and that patient's clinical status is appropriate for vagal maneuvers.
- 3) Briefly explain the overall procedure to the patient.
- 4) Have the patient take a deep breath.
- 5) Have the patient "bear down" against a closed glottis, as if trying to "clear" or "pop" their ears. Have the patient perform this for as long as they can. Alternatively, you may have the patient blow through a partially occluded drinking straw.
- 6) If no conversion, have the patient take another deep breath and repeat the procedure, up to three attempts total.
- 7) If still no conversion and **not contraindicated**, move to carotid sinus massage.

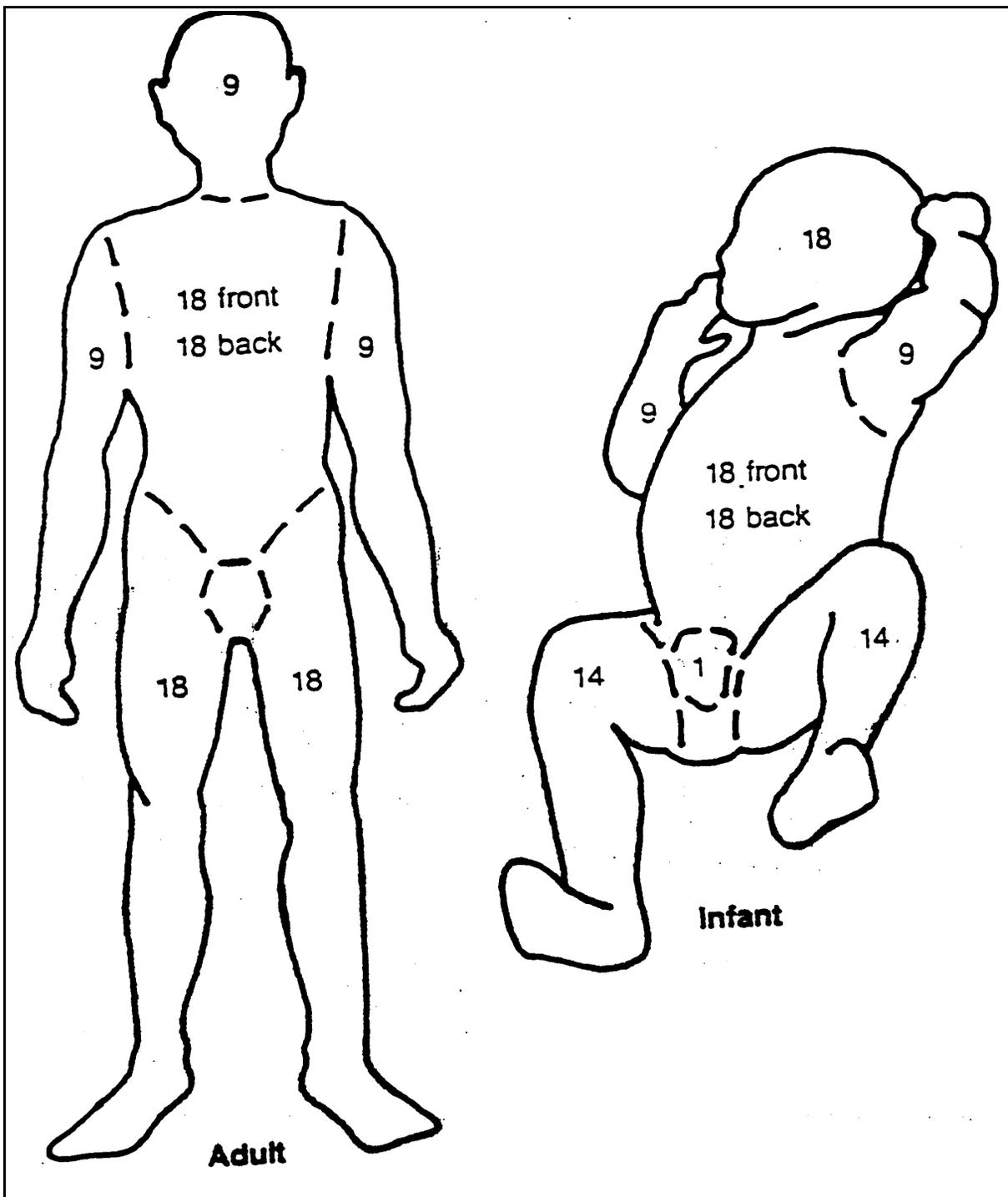
For Carotid Sinus Massage:

- 1) Place the patient supine or in semi-Fowler's position with neck extended.
- 2) Separately palpate each carotid artery for pulse quality and auscultate each for bruits.
- 3) Ensure that patient is on continuous ECG monitoring, is receiving O₂, and has a patent IV. Tilt the patient's head to one side.
- 4) Place the index and middle fingers over the carotid artery just below the angle of the jaw, and as high on the artery as possible.
- 5) Press the artery firmly back against the vertebral column and massage the artery.
- 6) Massage the artery until the first indication of conversion or heart block, but **no longer than 20 seconds**.
- 7) If no conversion after the first attempt, repeat the procedure once.
- 8) Contact Medical Control for further direction.

RULE OF NINES

For Estimating Percentage of Body Surface Area Burned

Count only 2nd and 3rd degree burn areas in determining BSA of burn



ADULT / PEDIATRIC GLASGOW COMA SCALE

Response	Adult	Child	Infant	Coded Value
Eye Opening	Spontaneous	Spontaneous	Spontaneous	4
	To speech	To speech	To speech	3
	To pain	To pain	To pain	2
	None	None	None	1
Best Verbal Response	Oriented	Oriented, appropriate	Coos and babbles	5
	Confused	Confused	Irritable, cries	4
	Inappropriate words	Inappropriate words	Cries in response to pain	3
	Incomprehensible sounds	Incomprehensible words or nonspecific sounds	Moans in response to pain	2
	None	None	None	1
Best Motor Response	Obeys	Obeys commands	Moves spontaneously and purposefully	6
	Localizes	Localizes painful stimulus	Withdraws in response to touch	5
	Withdraws	Withdraws in response to pain	Withdraws in response to pain	4
	Abnormal flexion	Flexion in response to pain	Decorticate posturing (abnormal flexion in response to pain)	3
	Extensor response	Extension in response to pain	Decerebrate posturing (abnormal extension in response to pain)	2
	None	None	None	1
Total Score Range				3-15

REVISED TRAUMA SCORE

Adult and Pediatric Patients

Glasgow Coma Scale Score	Systolic Blood Pressure (mm Hg)	Respiratory Rate (breaths/min)	Coded Value
13-15	>89	10-29	4
9-12	76-89	>29	3
6-8	50-75	6-9	2
4-5	1-49	1-5	1
3	0	0	0
Total Score Range			0-12

APGAR SCORE

Score at One and 5 Minutes After the Complete Birth of the Infant

Sign	0	1	2
Heart Rate	Absent	Slow (<100 bpm)	>100 bpm
Respirations	Absent	Slow, irregular	Good, crying
Muscle Tone	Limp	Some flexion	Active motion
Reflex Irritability (to a catheter in the nares)	No response	Grimace	Cough or sneeze
Color	Blue or pale	Pink body with blue extremities	Completely pink

NORMAL PEDIATRIC VITAL SIGNS

By Age and Weight

Age	Heart Rate	Systolic BP	Respirations	Weight (kg)
Newborn	100-160	50-70	30-60	3
1-6 weeks	100-160	70-95	30-60	4
6 months	90-120	80-100	25-40	7
1 year	90-120	80-100	20-30	10
3 years	80-120	80-110	20-30	15
6 years	70-100	80-110	18-25	20
10 years	60-90	90-120	15-20	30

As a rule of thumb the following simple formulas can also help estimate the approximate systolic blood pressures in the pediatric patient.

90th Percentile: Most children have a systolic BP at or above this level:

$$90 + (2 \times \text{age in years})$$

50th Percentile: A child with a blood pressure at or below this level is hypotensive:

$$70 + (2 \times \text{age in years})$$

BENZODIAZEPINE MEDICATIONS

Common or Trade Name	Generic Name
Valium	Diazepam
Librium	Chlordiazepoxide HCL
Dalmane	Flurazepam
Ativan	Lorazepam
Serax	Oxazepam
Halcion	Triazolam
Versed	Midazolam
Xanax	Alprazolam

TRICYCLIC ANTI-DEPRESSANTS

The following is a listing of tricyclic anti-depressants (TCA's) and closely related medications. TCA overdoses are managed with early administration of sodium bicarbonate and sodium bicarbonate infusion.

Common or Trade Names	Generic Name
Elavil, Amitid, Endep, Amitril	Amitriptyline
Tofranil, Presamine, SK-Pramine, Janimine	Imipramine
Aventyl, Panelor	Nortriptyline
Norpramin, Pertofrane	Desipramine
Adapin, Sinequan	Doxepin
Ascendin	Amoxapine
Ludiomil	Maprotiline
Desyrel	Trazodone

DOPAMINE INFUSION REFERENCE

There are two quick ways to calculate the initial infusion rate for dopamine. Both of these methods assume you have a concentration of 1600 mcg/ml (800 mg in 500 ml) and will start with an initial infusion rate of 5 mcg/kg/min.

First Method:

(Patient's weight in lbs) \div 10, then subtract 2 = starting gtt/min (minidrip set)

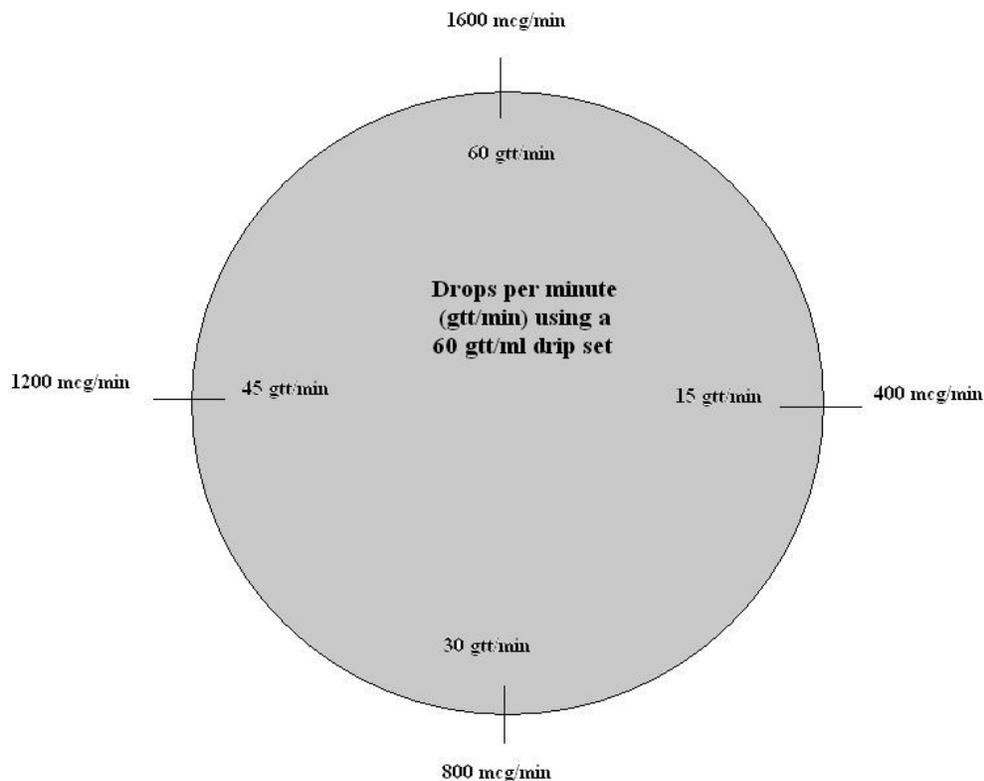
For example: Patient weighs 200 lbs, divide by 10 = 20, subtract 2 = 18 gtt/min from a minidrip set

Second Method (The Wheel):

(Patient's weight in kilograms) \times 5 = mcg/kg for the starting dose.

Find the spot on the outside of the wheel for this number (mcg/kg) and find the corresponding drip rate (gtt/min) on the inner part of the wheel. If the number is between two marks on the wheel, make an estimate.

For example: Patient weight 80 kg \times 5 = 400. On the inner part of the wheel this corresponds to 15 gtt/min, so the infusion would start at 15 drops/min from a minidrip set.



PEDIATRIC AND NEONATAL RESUSCITATION CHART

	Preemie	Preemie	Preemie	Term	6 Mo	1 yr	3 yrs	6 yrs.	10 yrs
Approx. Wt.	1 kg	1 kg	3 kg	3.5 kg	5 kg	10 kg	15 kg	20 kg	30 kg
Approx. HR	150	140	130	125	120	120	110	100	90
Approx. RR	50-60	50-60	40-60	40-60	30-50	22-30	22-26	20-24	18-22
ET Tube Size	2.5 mm	3.0 mm	3.5 mm	3.5 mm	3.5 mm	4.0 mm	4.5 mm	5.5 mm	6.0 mm
ETT Blade Size	0	0	0-1	1	1	2	2	3	3
Suction Cath.	5 Fr.	6 Fr.	8 Fr.	8 Fr.	8 Fr.	10 Fr.	10 Fr.	12 Fr.	14 Fr.
Defibrillation: 2 J/kg then 4 J/kg	2 J, 4J	4 J, 8 J	6 J, 12 J	7 J, 14 J	10 J, 20 J	20 J, 40 J	30 J, 60 J	4 J, 80 J	60 J, 120 J
Adenosine 0.1-0.2 mg/kg Max. single dose 12 mg	---	---	---	---	0.167 cc	0.34 cc	0.5 cc	0.67 cc	1.0 cc
Atropine 0.02 mg/kg Min. dose 0.1 mg, Max. single dose 0.5 mg (child) Max single dose 1.0 mg (adol.)	---	---	---	---	1.0 cc	2.0 cc	3.0 cc	4.0 cc	6.0 cc
Dextrose 50% Dextrose 25 %	---	---	---	---	---	---	15.0 cc	20.0 cc	30.0 cc
	2.0 cc	4.0 cc	6.0 cc	7.0 cc	10.0 cc	20.0 cc	---	---	---
Epinephrine 1:10,000 0.1 cc/kg (0.01 mg/kg) IV/IO	0.1 cc	0.2 cc	0.3 cc	0.35 cc	0.5 cc	1.0 cc	1.5 cc	2.0 cc	3.0 cc
Epinephrine 1:1,000 0.1 cc/kg (0.1 mg/kg) ET or “high dose”	0.1 cc	0.2 cc	0.3 cc	0.35 cc	0.5 cc	1.0 cc	1.5 cc	2.0 cc	3.0 cc
Fluid Challenge 20 cc/kg Neonates 10 cc/kg	---	---	---	---	100 cc	200 cc	300 cc	400 cc	600 cc
	10 cc	20 cc	30 cc	35 cc	---	---	---	---	---
Lidocaine 2% 1 mg/kg	0.05 cc	0.1 cc	0.15 cc	0.2 cc	0.25 cc	0.5 cc	0.75 cc	1.0 cc	1.5 cc
Sodium Bicarbonate 8.4% 1 mEq/kg Neonates 4.2%	---	---	---	---	---	10.0 cc	15.0 cc	20.0 cc	30.0 cc
	2.0 cc	4.0 cc	6.0 cc	7.0 cc	10.0 cc	---	---	---	---
Naloxone 0.1 mg/kg Max. single dose 2.0 mg	0.1 cc	0.2 cc	0.3 cc	0.35 cc	0.5 cc	1.0 cc	1.5 cc	2.0 cc	2.0 cc
Diazepam 0.25 mg/kg Lorazepam 0.1 mg/kg	0.05 cc	0.1 cc	0.15 cc	0.2 cc	0.25 cc	0.5 cc	0.75 cc	1.0 cc	1.5 cc

ACETAMINOPHEN (TYLENOL) SUSPENSION

PHYSIOLOGICAL ACTIONS:

Reduces fever (antipyretic) by acting directly on the heat regulating center of the hypothalamus

THERAPEUTIC EFFECTS:

Reduces fever

INDICATIONS:

Fever of any etiology in pediatric patients

CONTRAINDICATIONS:

None

DOSAGE:

15 mg/kg, maximum dose 1 Gm

ROUTE:

PO

PR

SPECIAL NOTES:

Doses may be repeated every 4 hours as needed, not to exceed 75 mg/kg total in a 24 hour period.

Hepatic damage begins at overdoses of about 150 mg/kg

SIDE EFFECTS:

Rarely, gastric irritation

ADENOSINE (ADENOCARD)

PHYSIOLOGICAL ACTIONS:

Directly blocks re-entrant mechanism in the atria and AV node
Decreases AV conduction

THERAPEUTIC EFFECTS:

Converts SVT.

INDICATIONS:

SVT, including Wolf-Parkinson-White syndrome

CONTRAINDICATIONS:

Sick-sinus syndrome (unless ventricular pacemaker is in place and functioning)
Second or third degree heart block
Ventricular tachycardia

DOSAGE:

Adult: 6 mg

- Repeat TWICE every 2 minutes as 12 mg if no conversion

Pediatric: 0.1 mg/kg up to 6 mg

- Repeat TWICE every 2 minutes as 0.2 mg/kg (max. of 12 mg) if no conversion

ROUTE:

RAPID IVP

See [Adenosine Administration](#) procedure

SPECIAL NOTES:

MUST be given very rapidly and as directly into the vein as possible
Repeat doses must be given in exactly two minutes
Will not convert A-fib or A-flutter

SIDE EFFECTS:

Brief dyspnea
Chest pressure
N/V
Hypotension
Significant cardiac pauses

ALBUTEROL (PROVENTIL, VENTOLIN)

PHYSIOLOGICAL ACTIONS:

Beta 2 agonist
Smooth muscle relaxant

THERAPEUTIC EFFECTS:

Bronchodilation

INDICATIONS:

Asthma
Exacerbation of COPD

CONTRAINDICATIONS:

Poor respiratory tidal volume
Tachydysrhythmias
Ventricular ectopy

DOSAGE:

2.5 mg in 2.5 (or 3) ml of NS

ROUTE:

Nebulized inhalation
ET, in case of obstructive airway with respiratory arrest

SPECIAL NOTES:

See [Nebulized Bronchodilation](#) procedure
Therapeutic effects may last 2-3 hours

SIDE EFFECTS:

Tachydysrhythmias
Ventricular ectopy
N/V
Anxiety
Palpitations

AMIODARONE (CORDARONE)

PHYSIOLOGICAL ACTIONS:

Prolongs intranodal conduction and AV node refractory period
Blocks beta receptors, sodium and potassium channels

THERAPEUTIC EFFECTS:

Antiarrhythmic

INDICATIONS:

Ventricular Fibrillation/Pulseless Ventricular Tachycardia
Stable Ventricular Tachycardia
Junctional Tachycardia, SVT, Atrial Flutter

CONTRAINDICATIONS:

Cardiogenic Shock
Symptomatic Bradycardia
Second or Third Degree AV Block

DOSAGE:

Adult Pulseless Patient:

- 300 mg IVP
- Repeat dose of 150 mg after 3 - 5 minutes

Pediatric Pulseless Patient:

- 5 mg/kg IVP, max dose 300 mg
- Repeat dose after 5 minutes: 5 mg/kg, max 150 mg

Post-resuscitation Infusion:

- 1.0 mg/min
- Mix 100 mg in 100 ml, infuse at 60 gtt/min (minidrip)

Perfusing Patient:

- Mix 150 mg in 100 ml, infuse over 10 minutes (Pedi 5 mg/kg up to 150 mg)

ROUTE:

IV/IO

SPECIAL NOTES:

Do not agitate or foaming may occur

SIDE EFFECTS:

Hypotension
Bradycardia

ASPIRIN (ASA)

PHYSIOLOGICAL ACTIONS:

- Inhibits platelet aggregation
- Diminished peripheral activity of prostaglandins

THERAPEUTIC EFFECTS:

- Anticoagulant
- Antipyretic
- Analgesic

INDICATIONS:

- Suspected AMI

CONTRAINDICATIONS:

- Bleeding disorders
- Active gastric/peptic ulcer
- Hypersensitivity

DOSAGE:

- 160 - 162 mg

ROUTE:

- PO

SPECIAL NOTES:

Instruct patient to chew pills and provide a small quantity of water if requested. This will increase absorption of the ASA and reduce its effects on the gastric mucosa.

SIDE EFFECTS:

- Gastric irritation
- Exacerbation of gastric ulcers

ATROPINE

PHYSIOLOGICAL ACTIONS:

Vagolytic

THERAPEUTIC EFFECTS:

Increases heart rate
Increases AV conduction
Reverses organophosphate intoxication

INDICATIONS:

Asystole
PEA
Bradycardias
Organophosphate poisoning

CONTRAINDICATIONS:

2° Type II-Fixed AV Block
Complete (3°) AV Block

DOSAGE:

Adult:

- Asystole / PEA: 1.0 mg repeat every 3-5 minutes up to 3 mg
- Bradycardia: 0.5 mg every 5 minutes up to 3 mg
- Organophosphate poisoning: 2 mg every 5 minutes until symptoms resolve

P ediatric:

- 0.02 mg/kg; min dose 0.1 mg, max single dose 0.5 mg
- Repeat every 3-5 minutes until max dose of 2 mg (1 mg for infants) is reached

ROUTE:

IV/IO push
May be ordered IM as well in organophosphate poisoning
ET

SPECIAL NOTES:

Must be given rapidly
Inadequate or slowly administered doses may result in a reflex bradycardia

SIDE EFFECTS:

Tachydysrhythmias
Ventricular ectopy
Dry mouth
Dilated pupils

DEXTROSE 50%

PHYSIOLOGICAL ACTIONS:

Carbohydrate glucose source

THERAPEUTIC EFFECTS:

Raises blood glucose level

INDICATIONS:

Hypoglycemia, established or suspected
Altered mentation of unknown cause

CONTRAINDICATIONS:

Intracranial hemorrhage
Cerebral edema
Increased ICP

DOSAGE:

Adult:

- 25 - 50 G of 50% solution

P ediatric:

- 0.5 G/kg
 - > 10 kg: 1 cc/kg of D50% solution
 - < 10 kg: 2 cc/kg of D25% solution
- D25% is prepared by diluting equal parts D50% and NS

ROUTE:

IV/IO push

SPECIAL NOTES:

Will cause severe tissue damage if extravasation occurs
MUST be preceded by thiamine in known or suspected alcoholics
Dextrose 25% can be made by diluting equal parts of NS and D50%, yielding 0.25 Gm/ml

SIDE EFFECTS:

Neurological symptoms in unprotected alcoholic patients if not preceded by thiamine

DILTIAZEM (CARDIZEM)

PHYSIOLOGICAL ACTIONS:

Calcium channel blocker

THERAPEUTIC EFFECTS:

Slows AV node conduction

Prolongs AV node refractory period

INDICATIONS:

Atrial Fibrillation or Atrial Flutter with rapid ventricular response

CONTRAINDICATIONS:

Sick-sinus syndrome, unless ventricular pacemaker is in place and functioning

Second or third degree heart block

Ventricular tachycardia

Wolff-Parkinson-White syndrome (accessory bypass tracts)

DOSAGE:

0.25 mg/kg administered over 2 minutes, up to maximum dose of 20 mg

Repeat once in 15 minutes if no conversion:

- 0.35 mg/kg administered over 2 minutes, up to maximum dose of 25 mg

ROUTE:

IV push over 2 minutes

SPECIAL NOTES:

Use with caution in patients with severe CHF, acute MI, or cardiomyopathy

Observe for bradycardias in patients taking other medications which affect AV conduction (i.e. digitalis, beta-blockers).

SIDE EFFECTS:

Hypotension

PVC's

DIPHENHYDRAMINE (BENADRYL)

PHYSIOLOGICAL ACTIONS:

Blocks histamine activity

THERAPEUTIC ACTIONS:

Reduces urticaria/itching and edema

Reverses extra-pyramidal symptoms

INDICATIONS:

Allergic reaction

Dystonic reactions

CONTRAINDICATIONS:

Asthma

Pregnancy

Intoxication from alcohol or depressants

DOSAGE:

Adult:

- 25 - 50 mg

P ediatric:

- 1 - 2 mg/kg, up to 25 mg

ROUTE:

IV

Deep IM

SPECIAL NOTES:

None

SIDE EFFECTS:

Sedation or drowsiness

Anti-cholinergic effects including wheezing

Blurred vision

DOPAMINE (INTROPIN)

PHYSIOLOGICAL ACTIONS:

Sympathomimetic; stimulates both Alpha and Beta receptors

THERAPEUTIC EFFECTS:

Increases heart rate
Increases blood pressure
Improves AV conduction

INDICATIONS:

Cardiogenic shock
Sepsis if hypotension refractory to IV fluid administration

CONTRAINDICATIONS:

Hypovolemia

DOSAGE:

5 - 20 mcg/kg/min, titrated to BP of 100 mmHg

- [Shortcut for starting dopamine infusion drip rate:](#)
 - Patient's weight in lbs/10, subtract 2 = starting gtt/min (minidrip set)
 - i.e. Patient weighs 180 lbs, divide by 10 = 18, subtract 2 = 16 gtt/min

ROUTE:

IV infusion

SPECIAL NOTES:

Causes increased myocardial oxygen demand
Pre-mix solution is 800 mg in 500 ml (1600 mcg/ml)
Administer by starting drip using the formula above, using a minidrip set. Ensure the tubing is primed with dopamine as very small volumes are being administered. If no effect is seen after 5 minutes, increase the dose by doubling the drip rate every 5 minutes until systolic BP is 100 mm Hg or higher

SIDE EFFECTS:

Tachydysrhythmias
Ventricular dysrhythmias
Myocardial ischemia

EPINEPHRINE (ADRENALIN) 1:1,000

PHYSIOLOGICAL ACTIONS:

Sympathomimetic; stimulates both Alpha and Beta receptors

THERAPEUTIC EFFECTS:

Bronchodilation
Increased systemic vascular resistance
Dilation of coronary arteries
Increased automaticity of myocardium

INDICATIONS:

Allergic reaction
Pediatric asthma
Adult asthma and COPD refractory to other interventions
Pediatric CPR, bradycardia, and refractory hypotension

CONTRAINDICATIONS:

Myocardial ischemia
Hypertension
Tachydysrhythmias
Pulmonary edema

DOSAGE:

Adult: 0.3 - 0.5 mg injection

P ediatric:

- Asthma / Allergic Reaction: 0.01 cc/kg
- CPR refractory to other efforts: 0.1 cc/kg
- Neonate: Use Epinephrine 1:10,000.
- Infusion: 0.1 - 1.0 mcg/kg/min: add 1 mg of 1:1,000 to 100 ml NS (1 mcg/ml)

ROUTE:

SQ
IV/IO, IV infusion
ET
SL (anaphylaxis)

SPECIAL NOTES:

Causes increased myocardial oxygen demand and increased heart rate

SIDE EFFECTS:

Ventricular ectopy
Tachydysrhythmias
Angina
Hypertension
Palpitations

EPINEPHRINE (ADRENALIN) 1:10,000

PHYSIOLOGICAL ACTIONS:

Sympathomimetic; stimulates both Alpha and Beta receptors

THERAPEUTIC EFFECTS:

Increased systemic vascular resistance
Dilation of coronary arteries
Bronchodilation
Increased automaticity of myocardium

INDICATIONS:

Cardiac Arrest
Anaphylaxis

CONTRAINDICATIONS:

None in these settings

DOSAGE:

Adult:

- Anaphylaxis: 0.1 mg IV push over 1 minute
- CPR: 1 mg, repeat every 5 minutes

Pediatric:

- Anaphylaxis: 0.01 cc/kg repeat every 5 minutes as needed
- Neonate CPR: 0.1 cc/kg repeat every 5 min as needed
- CPR / Bradycardia: 0.1 cc/kg repeat every 5 minutes as needed

ROUTE:

IV/IO push
ET

SPECIAL NOTES:

None

SIDE EFFECTS:

Ventricular ectopy
Tachydysrhythmias
Angina
Hypertension
Palpitations

FENTANYL (SUBLIMAZE)

PHYSIOLOGICAL ACTIONS:

Analgesia
CNS Depression

THERAPEUTIC EFFECTS:

Analgesia

INDICATIONS:

Relief of severe pain related to trauma without hypotension

CONTRAINDICATIONS:

Head injury
Bradycardia
Hypotension
Respiratory depression/failure

DOSAGE:

Adult: 1-2 mcg/kg

- Max dose 100 mcg
- May repeat dose in 15 minutes – 300 mcg maximum per patient

Pediatric: 1-2 mcg/kg

- Max dose 50 mcg
- May repeat dose in 15 minutes – 150 mcg maximum per patient

ROUTE:

IV
IN
IM

SPECIAL NOTES:

Approximately 80 times more potent than Morphine
Respiratory depression secondary to Fentanyl can be reversed with naloxone
Cardiac chest pain and analgesia for burns should be treated with Morphine

SIDE EFFECTS:

CNS/respiratory depression
Hypotension
N/V
Bradycardia
Diaphoresis

FUROSEMIDE (LASIX)

PHYSIOLOGICAL ACTIONS:

Vasodilation
Diuresis

THERAPEUTIC EFFECTS:

Reduce blood pressure
Reduce pulmonary and peripheral edema

INDICATIONS:

CHF with pulmonary edema

CONTRAINDICATIONS:

Dehydration
Hypotension

DOSAGE:

0.5 - 1.0 mg/kg

ROUTE:

Slow IV push
IM

SPECIAL NOTES:

Immediate effects occur through vasodilation
Diuresis occurs about 15-20 minutes after administration
Administer 0.5 mg/kg if patient is not currently taking furosemide, and 1.0 mg/kg if patient is on furosemide

SIDE EFFECTS:

Hypotension
N/V
Hypokalemia

GLUCAGON

PHYSIOLOGICAL ACTIONS:

Causes release of liver glycogen which can convert to glucose
Positive inotropic agent through non- α and non- β receptors

THERAPEUTIC EFFECTS:

Raises blood glucose level.

INDICATIONS:

Hypoglycemia, established or suspected
Unable to obtain IV access for dextrose administration
 β -blocker overdose

CONTRAINDICATIONS:

Pheochromocytoma (adrenal gland tumor resulting in high levels of circulating epinephrine and norepinephrine)

DOSAGE:

Adult:

- 1 unit (1 mg)

Pediatric:

- 0.5 unit (0.5 mg).

ROUTE:

IM

IV for calcium channel blocker or β -blocker overdose

SPECIAL NOTES:

Must be reconstituted prior to administration

May take up to 15 minutes for patient to respond

Glucagon is an inotropic agent that increases force of myocardial contraction through non- α , non- β receptors. It can be useful in mild to moderate shock induced by β -blocker overdose.

Glucagon should be administered with MC's approval at 1-2 mg IV push. Vasopressors such as dopamine may also be required.

SIDE EFFECTS:

Occasional nausea/vomiting

LIDOCAINE (XYLOCAINE)

PHYSIOLOGICAL ACTIONS:

Slows AV and intra-ventricular conduction

Sodium channel blocker, resulting in suppressed neuron conduction (anesthesia)

THERAPEUTIC EFFECTS:

Suppresses ICP increase due to laryngeal manipulation

Local anesthetic

INDICATIONS:

Anesthetic for IO infusion with conscious patient

Prior to oral intubation of CVA or Head Injury patients

CONTRAINDICATIONS:

Bradycardia

Any heart block

DOSAGE:

IV Push:

- Pre-intubation for patients with ICP concerns: 1.5 mg/kg

IO:

- 40 mg push over 1 minute. Allow to sit for an additional 2 minutes to achieve anesthetic effect before beginning fluid infusion.

ROUTE:

IV/IO push

SPECIAL NOTES:

No longer used as an antiarrhythmic in MMS protocols, but has uses for pre-intubation of patients with possible increased ICP and anesthesia for IO infusions.

Should be given no faster than 50 mg/min.

SIDE EFFECTS:

Seizures or altered mental status

Suppressed myocardial activity

LORAZEPAM (ATIVAN)

PHYSIOLOGICAL ACTIONS:

Raises seizure threshold at neuromuscular junction
Limits propagation of seizure in brain
CNS depressant
Amnestic

THERAPEUTIC EFFECTS:

Anticonvulsant
Sedative to facilitate therapies

INDICATIONS:

Status seizures
Sedation for procedures

CONTRAINDICATIONS:

Pregnancy, except as anticonvulsant for eclamptic seizure refractory to magnesium sulfate

DOSAGE:

Adult:

- Seizure: 2 - 4 mg IV, may repeat once in 10 minutes
- Sedation: 2 mg IV, may repeat once in 10 minutes

Pediatric:

- Seizure: 0.1mg/kg IV, max single dose 2 mg, may repeat once in 10 minutes
- Sedation: 0.1 mg/kg IV, max single dose 2 mg

ROUTE:

IV/IO

SPECIAL NOTES:

Must be stored between 35 and 45F.

For IV dose, dilute with equal quantity of NS, administer at rate of 2 mg/minute

Dose is individualized to each patient, use the minimal amount necessary to achieve the therapeutic response desired

Titrate to desired effect while closely observing for respiratory depression

SIDE EFFECTS:

Respiratory depression

MAGNESIUM SULFATE

PHYSIOLOGICAL ACTIONS:

Nervous system depressant

THERAPEUTIC EFFECTS:

Raises seizure threshold

Decreases BP through vasodilation

Anti-convulsant

Corrects some ventricular dysrhythmias (Torsades de Pointes, etc.)

Smooth muscle relaxant

INDICATIONS:

Toxemia of pregnancy (eclampsia and preeclampsia)

Hypomagnesemic induced ventricular irritability

Torsades de Pointes

Refractory V-Fib

Asthma refractory to other treatments

CONTRAINDICATIONS:

Heart block

DOSAGE:

Toxemia:

- 2 G IV and 2 G IM

Pulseless Dysrhythmias:

- 2 G IV

Perfusing Dysrhythmias/Asthma:

- 2 G (4 ml) diluted in 6 ml IV fluid (total volume of 10 ml) over 1-2 min slow push

ROUTE:

IV/IO

IM

IV/IO infusion

SPECIAL NOTES:

Give *slowly* (over ~2 minutes) when used IV/IO on perfusing patients

Used with caution in AMI

SIDE EFFECTS:

Hypotension

CNS or respiratory depression

Weakness

METHYLPREDNISOLONE (SOLUMEDROL)

PHYSIOLOGICAL ACTIONS:

Suppresses immune reactions

THERAPEUTIC EFFECTS:

Reduces or inhibits allergic reactions

Reduces or inhibits asthma attacks and exacerbation of COPD

INDICATIONS:

Allergic reactions

Severe, refractory asthma

Severe, refractory exacerbation of COPD

CONTRAINDICATIONS:

Systemic fungal infections

DOSAGE:

Adult:

- 125 - 250 mg

Pediatric:

- 2 - 3 mg/kg, max dose of 125 mg

ROUTE:

IV

IM

SPECIAL NOTES:

Onset of action is 30 minutes to 1 hour

Effects may last up to 48 hours

SIDE EFFECTS:

None in the acute setting

MIDAZOLAM (VERSED)

PHYSIOLOGICAL ACTIONS:

CNS depressant
Amnestic

THERAPEUTIC EFFECTS:

Sedative to facilitate therapies
Chemical Restraint

INDICATIONS:

Sedative / amnestic for procedures which would cause discomfort to the patient
Sedative to facilitate orotracheal intubation
Status seizure refractory to diazepam/lorazepam
Violent patients requiring chemical restraint

CONTRAINDICATIONS:

Pregnancy, except as anticonvulsant for eclamptic seizure refractory to magnesium sulfate and diazepam/lorazepam

DOSAGE:

Sedation: 0.05 - 0.1 mg/kg IV, titrated to effect up to 5 mg (Adult), 2 mg (Pedi)
Intubation: 0.1 - 0.3 mg/kg IV, titrated to effect up to 20 mg (Adult), 2 mg (Pedi)
Seizure: 0.1 mg/kg IV or 0.3 mg/kg IN up to 5 mg (Adult and Pedi)
Chemical Restraint: 0.1 mg/kg IV up to 5 mg, or IM up to 10 mg (Adult), 5 mg (Pedi)

ROUTE:

IV/IO
IM
IN

SPECIAL NOTES:

Since midazolam can cause significant hypotension, its use in the hypotensive patient for rapid sequence induction/intubation should be used with extreme caution and titrated to effect.
Dose is individualized to each patient
Titrate to desired effect while closely observing for respiratory depression or hypotension

SIDE EFFECTS:

Respiratory depression
Hypotension

MORPHINE SULFATE

PHYSIOLOGICAL ACTIONS:

- Depresses CNS functions
- Induces vasodilation (both arterial and venous)
- Reduces both preload and systemic vascular resistance (afterload)

THERAPEUTIC EFFECTS:

- Analgesia
- Vasodilation, with resulting increase in myocardial perfusion, decrease in myocardial work, reduction in pulmonary edema

INDICATIONS:

- Relief of severe pain
- Myocardial ischemia
- Pulmonary edema

CONTRAINDICATIONS:

- Head injury
- Altered mentation
- Hypotension
- Respiratory depression/failure

DOSAGE:

Adult: 2 - 20 mg in increments of 2 mg.

Pediatric: 0.1 - 0.2 mg/kg in increments of 0.05 mg/kg

- Max. single dose of 2 mg

ROUTE:

- IV
- IM
- SQ

SPECIAL NOTES:

- Respiratory depression secondary to MS can be reversed with naloxone
- Promethazine may be used to reduce nausea associated with MS
- Promethazine will increase effects of MS

SIDE EFFECTS:

- CNS/respiratory depression
- Hypotension
- N/V
- Bradycardia
- Diaphoresis

NALOXONE (NARCAN)

PHYSIOLOGICAL ACTIONS:

Competitively blocks opiate receptors

THERAPEUTIC EFFECTS:

Reduces or reverses intoxication from narcotics, synthetic narcotics, alcohol, and other substances

INDICATIONS:

Known or suspected narcotic overdose
Altered mentation of unknown etiology

CONTRAINDICATIONS:

None.

DOSAGE:

Adult: 0.5 – 2.0 mg IV, may administer up to 8 mg

- *OR* 2.0 mg IN (1 mg per nostril) if IV route is delayed or not available
- *OR* 2.0 mg IM if IV or IN routes are delayed or not available

Pediatric: 0.1 mg/kg IV up to 2 mg single dose.

ROUTE:

IV
ET
IM
IN

SPECIAL NOTES:

Substances other than narcotics and opiates will respond to naloxone, but require relatively high doses

SIDE EFFECTS:

Withdrawal symptoms in addicted patients
Agitation or combativeness

NITROGLYCERINE (NITROSTAT/NTG/NITROLINGUAL)

PHYSIOLOGICAL ACTIONS:

Smooth muscle relaxant

THERAPEUTIC EFFECTS:

Vasodilation
Reduction in BP
Coronary artery dilation

INDICATIONS:

Myocardial ischemia
Pulmonary edema

CONTRAINDICATIONS:

Hypotension
Hypovolemia
Increased ICP
Patient's use of medication for erectile dysfunction within the past 24 hours

DOSAGE:

0.4 mg pre-metered spray
Repeat every 5 minutes up to 3 doses total

ROUTE:

SL

SPECIAL NOTES:

Recheck BP before administering each dose
Occasionally causes sharp reduction in BP
Be prepared to support BP with positioning and fluids
Not for use with pediatric patients < 40 kg
Ask ALL patients about E.D. med use prior to NTG administration

SIDE EFFECTS:

Hypotension
Syncope
Headache
Dizziness
Flushing
Tachycardia

ONDANSETRON (ZOFTRAN)

PHYSIOLOGICAL ACTIONS:

Selective serotonin receptor inhibitor
Antiemetic

THERAPEUTIC EFFECTS:

Reduces nausea/vomiting

INDICATIONS:

Nausea

CONTRAINDICATIONS:

Prolonged QT Interval
Severe hepatic disease

DOSAGE:

Adult: 4 mg

- IV administration over 30 seconds

Pediatric: 0.1 mg/kg up to 4 mg

- IV administration over 30 seconds

ROUTE:

IV
IM

SPECIAL NOTES:

Minimal sedative effect
Does not potentiate the effects of Morphine
Promethazine is preferred if the patient is actively vomiting

SIDE EFFECTS:

Headache
Dizziness
Blurred vision
Fever

ORAL GLUCOSE (GLUTOSE, INSTA-GLUCOSE)

PHYSIOLOGICAL ACTIONS:

Carbohydrate glucose source

THERAPEUTIC EFFECTS:

Raises blood glucose level

INDICATIONS:

Hypoglycemia, established or suspected

CONTRAINDICATIONS:

Decreased mental status (unable to manage PO substances)

DOSAGE:

25 - 80 G of paste

ROUTE:

PO

SPECIAL NOTES:

May be given to patients with altered mental status but intact gag reflex by carefully "smearing" the paste on the oral mucosa

Is distasteful

SIDE EFFECTS:

None

OXYGEN

PHYSIOLOGICAL ACTIONS:

Increases oxygen tension in blood

THERAPEUTIC EFFECTS:

Reduces or reverses hypoxemia or ischemia

INDICATIONS:

All hypoxic or ischemic patient, known or suspected

CONTRAINDICATIONS:

None

DOSAGE:

Varies with administration device and patient need

ROUTE:

Inhalation

SPECIAL NOTES:

When administering to COPD patients, watch closely for respiratory depression and be prepared to assist ventilations

SIDE EFFECTS:

Drying of mucous membranes if not humidified

PROMETHAZINE (PHENERGAN)

PHYSIOLOGICAL ACTIONS:

Antihistamine
H1 antagonist
CNS sedative (selective functions)

THERAPEUTIC EFFECTS:

Reduces nausea/vomiting
Potentiates narcotics

INDICATIONS:

Nausea/vomiting

CONTRAINDICATIONS:

Hypotension
Altered mental status

DOSAGE:

Adult: 6.25 - 12.5 mg
• May repeat once in 15 minutes if no relief

Pediatric: 0.5 mg/kg up to 12.5 mg

ROUTE:

IV

SPECIAL NOTES:

STOP infusion if patient reports pain at injection site
Can cause severe tissue damage if extravasation occurs
Must be diluted in 9 ml's of NS prior to slow IV administration
If given with MS, will potentiate the effects of the MS
Dose should be reduced to 6.5 mg in elderly patients

SIDE EFFECTS:

Hypotension
Sedation

SODIUM BICARBONATE

PHYSIOLOGICAL ACTIONS:

Increases systemic pH by binding hydrogen ions

THERAPEUTIC EFFECTS:

Reduces metabolic acidosis

Interferes with the activity of certain drugs (specifically, tricyclic antidepressants)

INDICATIONS:

Metabolic acidosis

Symptomatic tricyclic anti-depressant overdose (with cardiac dysrhythmias or significant mental status change)

Cardiac arrest with suspected hyperkalemia

CONTRAINDICATIONS:

Hypokalemia

Congestive heart failure

DOSAGE:

1.0 mEq/kg, repeat doses are 0.5 mEq/kg at 10 min intervals

Neonates: must receive bicarb at half the adult concentration (4.2 %)

TCA Overdose: 1 mEq/kg initial bolus, followed by 0.05 mEq/ml infusion (50 mEq/1000 ml NS or 25 mEq/500 ml NS) titrated to systolic BP > 90 mmHg.

Crush Injury: Add **50 mEq Sodium Bicarbonate** to even numbered liters of IV fluids (i.e. 2nd, 4th, etc.)

ROUTE:

IV

SPECIAL NOTES:

RARELY indicated, except where metabolic acidosis is known or clearly the most probable culprit, such as DKA, ASA, or TCA overdose, ethylene glycol poisoning, etc.

Ca rdial arrest patients with a history of renal failure or other factors predisposing them for hyperkalemia should receive bicarb early in the resuscitation.

SIDE EFFECTS:

Volume overload

Cellular acidosis

Hypokalemia

TERBUTALINE (BRETHINE)

PHYSIOLOGICAL EFFECTS:

Beta 2 agonist
Smooth muscle relaxant

THERAPEUTIC EFFECTS:

Bronchodilation
Uterine relaxation (inhibition of contractions)

INDICATIONS:

Asthma
Exacerbation of COPD
Premature labor

CONTRAINDICATIONS:

None

DOSAGE:

0.25 mg

- May repeat once in 15 minutes if no relief
- May repeat PRN for premature labor contractions

ROUTE:

SQ
Nebulized inhalation

SPECIAL NOTES:

Generally not used in pediatrics < 35 kg
If administered through nebulized inhalation, dilute in 2.5 ml NS. See [Nebulized Bronchodilation](#) procedure

SIDE EFFECTS:

In high doses, may have beta 1 properties (increased heart rate, etc.)
Tremors
Agitation and excitability, especially in pediatric patients

TETRACAINE

PHYSIOLOGICAL ACTIONS:

Local ocular anesthesia

THERAPEUTIC EFFECTS:

Provides relief from pain of eye injuries

INDICATIONS:

Corneal Abrasions

Foreign bodies

Chemical irritations of the eye

CONTRAINDICATIONS:

Open or disrupted globe

DOSAGE: 1-2 gtts each eye, repeat every 10 minutes as needed

ROUTE:

Topical

SPECIAL NOTES:

None

SIDE EFFECTS:

May sting or burn initially

THIAMINE

PHYSIOLOGICAL ACTIONS:

Allows glucose metabolism
Protects nervous system from hypertonic insult

THERAPEUTIC EFFECTS:

Allows D50% administration in malnourished or de-myelinated patients
Prevents or reverses Wernicke's encephalopathy

INDICATIONS:

Chronic alcoholism or suspected malnutrition
Altered mentation of unknown etiology
Prior to D50% administration to patients in whom alcohol abuse history cannot be ruled out

CONTRAINDICATIONS:

None

DOSAGE: 100 mg

ROUTE:

IV
IM

SPECIAL NOTES:

If used with dextrose, MUST PRECEDE D50% or oral glucose gel

SIDE EFFECTS:

None

DRUG LIST AS PER MEDICAL DIRECTOR

Occasionally drugs on this list may not be available in concentrations or amounts which are indicated below. Regardless of the manner in which the drugs are supplied, equivalent total amounts indicated in the Minimum Stocking column must be present. Unless otherwise specified, generic and brand name products are considered interchangeable. All drugs are to be stored in accordance with the manufacturer's recommendations.

<u>MEDICATION</u>	<u>PACKAGING</u>	<u>MINIMUM STOCKING</u>
Acetaminophen Suspension	32 mg/ml	240 ml
Adenosine	6 mg/2 ml	30 mg
Albuterol	2.5 mg/3 ml	10 mg
Amiodarone	150 mg/3 ml	600 mg
Aspirin	80-81 mg chewable tabs	800 mg
Atropine	1 mg/10 ml	4 mg
Dextrose 50%	25 G/50 ml	100 G
Diltiazem	25 mg/5 ml	50 mg
Diphenhydramine	50 mg/2 ml	100 mg
Dopamine (premix)	800 mg/500 ml	1600 mg
Epinephrine 1:1,000	1 mg/1 ml	5 mg
Epinephrine 1: 10,000	1 mg/10 ml	10 mg
Fentanyl	100 mcg/2 ml	300 mcg
Furosemide	100 mg/10 ml	200 mg
Glucagon	1 unit (1 mg)/ml	2 units (2 mg)
Lidocaine (preservative free)	100 mg/5 ml	300 mg
Lorazepam	2 mg/ 1 ml	8 mg
Magnesium Sulfate	5 G/10 ml	10 G
Methylprednisolone	125 mg/10 ml	500 mg
Midazolam	10 mg/2 ml	30 mg
Morphine Sulfate	10 mg/1 ml	30 mg
Naloxone	2 mg/1 ml	8 mg
Nitroglycerin	Spray btl	1 btl
Normal Saline IV solution	500 ml or 1000 ml	5000 ml
Ondansetron	4 mg/2 ml	8 mg
Oral Glucose paste	25-80 G	2 tubes
Promethazine	25 mg/1 ml	50 mg
Sodium Bicarbonate	44.6 (or 50) mEq/10 ml	133.8 - 150 mEq (3)
Terbutaline	1 mg/1 ml	2 mg
Tetracaine .5%	Drops btl	2 btl
Thiamine	100 mg/2 ml	200 mg



Suresh Chavda, M.D., MMS Medical Director

Effective Date: January 1, 2011 to May 31, 2012

MEDICAL EQUIPMENT AND SUPPLIES

The following is the minimum patient care equipment and supplies required by Metrocrest Medical Services. The designations of "Basic" and "Advanced Life Support" and "Mobile Intensive Care Unit" are based upon the level of care authorized by MMS for that unit and service, as described in "Definition of Terms" and outlined in the Medical Control Policy manual.

<u>Basic Life Support</u>	<u>Minimum Stock</u>
Sphygmomanometer: Infant, Pedi, Adult, Large adult (or thigh) sizes	1 ea
Stethoscope:	1
Thermometer: Tympanic or temporal scan, and rectal	1 ea
Penlight:	1
Electronic blood-glucose determination device:	1
Supplies for blood-glucose determination device: Lancets, reagent strips	10 ea
Alcohol prep pads:	20
Trauma Shears:	1
Ring Cutter:	1
Portable oxygen cylinders: 500 psi minimum	2
Vehicle mounted oxygen cylinder and delivery system: 500 psi minimum:	1
Oxygen humidifier:	1
Nasal Cannula:	4
Oxygen Tubing:	2
Adult Non-rebreather oxygen mask:	4
Pedi Non-rebreather oxygen mask:	4
Oxygen-driven Nebulizers (with T-bar adapter):	2
Oropharyngeal Airways: 40, 60, 70, 80, 90, 100mm	1 ea
Nasopharyngeal Airways: 22, 26, 30 Fr.	1 ea
Water soluble lubricant: Packets of 1-2 oz	4
King LTS-D airways: size 3, 4, and 5	1 ea
BVM: Adult, Pedi, Infant sizes:	1 ea
Vehicle Mounted Suction Unit:	1
Portable Suction Unit:	1
Suction Tubing:	2
Yankauer Suction Catheter:	2
Spare Suction Canister: for Vehicle and Portable suction units	1 ea
4X4 Sterile gauze:	20
5X9 Abd pads:	5
Multi-Trauma dressings:	4
Sterile Burn Sheets:	3
Triangular bandages:	10
Roller gauze:	10
Occlusive dressings:	4
Quikclot ACS bandages:	2
Tape: 1", 2"	3 ea

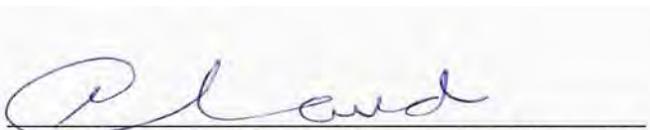


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Basic Life Support (continued)**Minimum Stock**

Coban:	1 roll
Band-aids:	10
Normal Saline Irrigation Solution: 500 or 1000 ml containers	2000 ml
Chemical cold packs:	4
Board Splints: short (~12"), med (18-24") and long (~36")	2 ea
OR Vacuum splints or air splints:	1 set
Traction Splint: adult, pedi	1 ea
Long Spine Boards:	2
Strapping for spinal immobilization:	
3 straps (or approved equivalent) per set, each at least 48" long	2 sets
MMS-approved cervical immobilization device:	2
Cervical Collars: No-Neck, Short, Regular, Tall sizes or equivalent	2 ea
OR Adjustable size Adult Cervical Collars:	6
Cervical Collars: Infant, Pedi	1 ea
Kendrick Extrication Device or equivalent:	1
Stair Chair:	1
Scoop Stretcher:	1
Wheeled stretcher capable of being secured in ambulance:	1
Stretcher sheets:	6
Water, potable: 8, 16, or 32 oz containers	32 oz total
Commercial Electrolyte Substitute (Oral):	2
Obstetrics Kit	2
Emesis bags or basins:	4
Face Shields:	6
Medical Eye Protection:	2
Medical Protective Gowns or equivalent:	2
Medical Respiratory Protection Masks:	2
Gloves, protective, nonporous, exam gloves: M, L, XL	1 box ea
Tuberculocidal cleaning solution:	1
Paper towels:	30
Biohazard bags:	2
AED or equivalent:	1
Emergency Warning devices: strobes, flares, or reflectors	3
Retroreflective Traffic Safety Vests:	2
No smoking signs: in cab and in patient compartment	1 ea
Personal cleansing supplies: towlettes, foam, or gel	1
Fire extinguisher:	1
Flashlight, portable, battery powered (not a penlight)	1
MMS Patient Care Protocols for Therapy book:	1
DOT Emergency Response Guidebook:	1



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Advanced Life SupportMinimum Stock

All BLS items	
Injection locks for IV:	5
Injectable normal saline: 2, 5, or 10 ml	5
1 cc syringes with 25 ga 5/8" needle:	5
3 cc syringes:	5
10 cc syringes:	5
30 cc syringes:	3
Needles for syringes: 18 ga or 21 ga	5
Mucosal Atomization Device:	2
Needle-less IV system blunt cannulas and IV system piggyback connectors, OR IV tubing with luer lock adapters for needle-less access	5 ea
Intravenous catheters (over-the-needle): 14 ga, 16 ga, 18 ga, 20 ga, 22 ga	5 ea
EZ IO Driver	1
EZ IO Intraosseous needles: 15, 25, 45 mm	2 ea
EZ IO Extension tubing	2
IV Pressure Infuser Bag	1
IV administration set and tubing:	
Macro or volume (10, 12, or 15 gtts/ml)	4
Micro or mini (60 gtts/ml) OR Dial-A-Flow or equivalent device:	2
Pulse oximeter with adult/pedi probes:	1
Positive end expiratory pressure valve (PEEP):	1
Auditory ("whistle") tip device for naso-tracheal intubation:	1
Esophageal Intubation Detector device:	2
Quantitative ETCO ₂ Detector: may be incorporated into cardiac monitor:	1
Circuits for ETCO ₂ Detector: ET tube and cannula type	2 ea
Laryngoscope handle with batteries:	1
Laryngoscope blades: Miller (straight) #1 - 4, MacIntosh (curved) # 1 - 4	1 ea
Endotracheal tubes: 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0 mm	2 ea
Stylettes: adult, pedi (may be included in ETT package)	2 ea
Bougie type tracheal tube introducer:	1
Magill forceps	1
DeLee Suction or other meconium aspiration device	1
Rusch QuikTrach 4.0 mm and 2.0 mm	1 ea
Needle chest decompression kit:	1
Asherman Chest Seal	2
Scalpel, #10 size	1
Sharps container	1
Broselow Pediatric Emergency Tape, 2005 edition	1
Continuous Positive Airway Pressure (CPAP) Device:	1
Patient Administration Circuits for CPAP Device:	2



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Mobile Intensive Care Unit

All BLS and ALS items	
0.9% NaCl (normal saline) solution for IV use, 100 ml,	
OR "Buretrol" type IV sets, with 100 ml chamber:	2
Nasogastric tubes: 10, 14, 16, 18 french sizes:	1 ea
60 cc syringes: catheter tip type:	2
ECG monitor/defibrillator with 12 lead and external cardiac pacing capability:	1
Pacing/defibrillation pads: adult, pedi:	2 sets ea
ECG electrodes:	30
ECG paper:	1 roll



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