

DANE COUNTY ALS
SYSTEM
MEDICAL TREATMENT
PROTOCOLS



This book is dedicated to the memory of **Dr. Darren Bean**, Medical Director for the City of Madison Fire Department, who was instrumental in the development of this ALS System. Dr. Bean died on May 10, 2008 while on duty transporting a patient in his capacity as a MedFlight physician.

It was Dr. Bean's vision to have protocols and procedures that were consistent throughout Dane County, and he worked tirelessly with the Dane County ALS service providers and Dane County EMS to achieve this goal.

We are proud to have worked with him in this effort, and in memoriam, we thank Dr. Bean for his vision, energy, and dedication.

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Overview

The Dane County ALS System Protocols contained within this document are intended to provide and ensure uniform treatment for all patients who receive care from ALS agencies participating in the Dane County ALS System. These protocols apply exclusively to agencies responding to activation of the 911 system within Dane County, and who participate in centralized medical oversight provided by the Medical Director of the University of Wisconsin, Division of Emergency Medicine/Dane County ALS System. Any other use must receive prior approval from the Medical Director, Dane County ALS System.

While attempts have been made to address all patient care scenarios, unforeseen circumstances and patient care needs will arise. For these instances medical personnel should follow the “General Approach” protocols (or other appropriate protocol), exercise their own judgment, and contact On-line Medical Control (OLMC) for additional physician orders as needed. The patient’s best interest should be the final determinant for all decisions.

Acknowledgements

The Medical Director wishes to thank the following agencies and individuals for their hard work and commitment during the development of these protocols.

Contributing Agencies and Individuals:

City of Madison Fire Department
City of Middleton Emergency Medical Services
Fitch Rona Emergency Medical Services District
Michael Kim, MD
Lee Faucher, MD
Deb Martin-Lightfoot
Nancy Robinson
Sun Prairie Emergency Medical Services
Town of Madison Fire Department

Authorization

In accordance with Wisconsin Statute 256 and Chapter 112 of the Wisconsin Administrative Code, effective 01/05/2011 the following medical treatment protocols are authorized by the Medical Director for use in the Dane County ALS System. Changes to these protocols can be made only with authorization of the Medical Director.

A handwritten signature in black ink, appearing to read 'C. Zuver MD', with a stylized flourish at the end.

Christian C. Zuver, MD, FACEP
Medical Director
Dane County ALS System

General Principles for Medical Care

The following measures shall be applied to help promote prompt and efficient emergency medical care to the sick, ill, injured, or infirmed. They shall be utilized by EMS personnel in the field, in the Emergency Department, and when dealing with On-line Medical Control Physicians.

1. The safety of EMS personnel is paramount. Each scene must be properly evaluated for crew safety and hazards upon arrival and throughout patient care. Assess the need for additional public safety resources as soon as possible after arrival.
2. Proper Personal Protective Equipment and Body Substance Isolation must be utilized according to agency and industry standards.
3. A patient is any person who is requesting and/or in need of medical attention or medical assistance of any kind.
4. A patient care encounter shall be considered any event when subjective or objective signs or symptoms, or a patient complaint, results in evaluation or treatment.
5. All patients in the care of EMS shall be offered transport by ambulance to the nearest appropriate hospital, regardless of the nature of the complaint. In the event a patient for whom EMS has responded refuses transport to the hospital, a properly executed refusal process must be completed.
6. In accordance with system guidelines, the only appropriate transport destination for EMS patients transported by ambulance is an Emergency Department. Exceptions to this are outlined within the specific protocols. Additional details concerning hospital destination based on clinical criteria are outlined in specific protocols.
7. For all 911 calls, upon initial patient contact, be prepared for immediate medical intervention appropriate for the call level (defibrillation, airway management, drug therapy etc.).
8. Upon arrival at a scene where an initial EMS crew is rendering patient care, all subsequent arriving EMS crews should immediately engage the on-scene crew. The goal is to determine the status of assessment and seamlessly assist in patient care.
9. Prior to the transfer of care between crews, the provider rendering initial care should directly interface with the provider assuming care, to ensure all pertinent information is conveyed.

10. For all patients in cardiac arrest, call into dispatch “patient contact time” at the time of initial patient contact and “first shock time” at the time of initial defibrillation.
11. Try to always obtain verbal consent prior to treatment. Respect the patient’s right to privacy and dignity. Courtesy, concern and common sense will ensure the patient of the best possible care.
12. The paramedic should generally be able to decide within 3 minutes after patient contact if advanced life support (ALS) measures will be needed. If identified, they should be instituted simultaneously with the initial assessment. A comprehensive exam is appropriate after the patient has been stabilized.
13. Generally, initial assessment and therapy should be completed within 10 minutes after patient contact. Except for extensive extrication, or atypical situations, trauma patients should be en route to the receiving facility within 10 minutes and medical patients should be en route to the receiving facility within 20 minutes. Additional therapy, if indicated, should be continued during transport.
14. For all 911 calls where EMTs and paramedics are in attendance, the paramedic shall make final patient care decisions.
15. Prior to administration of medication, assess for the possibility of medication allergies. If any questions arise in reference to medication allergies, contact On-Line Medical Control (OLMC) prior to giving any medications.
16. When caring for pediatric patients, use the Broslow-Luten® weight/length based system to determine medication dosages and equipment sizes.
17. An EMS Patient Care Report will be generated at the conclusion of each patient encounter. Patient care reports should be transmitted to the receiving hospital in accordance with state requirements.
18. For cases that do not exactly fit into a treatment category, refer to the general illness protocol and contact OLMC as needed.
19. Following training and successful competency assessment by their respective agencies, EMT’s in this system are authorized to apply pulse oximetry and capnography monitoring devices, perform blood glucose evaluations, perform bag-valve-mask ventilation, perform Laryngeal Tube Airway (LTA) insertion and ventilation and perform bag-valve-mask ventilation of paramedic placed LMA or endotracheal tubes. Individual

agencies must request and receive state approval prior to implementation of these skills.

20. To perform as an EMT/Paramedic, personnel must be knowledgeable and proficient in the scope of practice described and taught in the Department of Transportation National Standardized Curriculum, and maintain active state certificates.
21. Perform all procedures as per the Dane County ALS System Procedures Manual. If a procedure that is not addressed in this manual is deemed necessary, contact OLMC or the receiving hospital physician for orders prior to proceeding.
22. If OLMC gives orders for performance of a procedure that is not covered in the Dane County ALS System Procedures Manual, but is within the scope of practice of an EMT/Paramedic, follow the Department of Transportation National Standard Curriculum.
23. For all cases where patients require administration of narcotics or sedative agents, continuous cardiac, oxygen saturation, and ETCO₂ monitoring shall be performed.
24. The Regional Poison Control Center (RPCC) should be contacted when handling calls involving poisonous/hazardous material exposures, overdoses or suspected envenomation. In the event that the RPCC gives recommendations or orders that are not contained within these protocols, EMS providers are authorized to carry out the RPCC's instructions. The RPCC can be reached at 1.800.222.1222.
25. All defibrillators used in the Dane County ALS System must be able to deliver biphasic energy.
26. When using supplemental oxygen in accordance with adult or pediatric treatment protocols, adhere to the following.
 - A. In patients who are non-critical, and have no evidence of respiratory distress, use only the concentration of oxygen needed to achieve oxygen saturations over 95%. Typically this may be accomplished by the use of a nasal cannula.
 - B. For patients with serious respiratory symptoms, persistent hypoxia or where otherwise specified in protocol, use 100% supplemental oxygen via non-re-breather mask or BVM.

Medical Transport Destination

All patients should be transported to the hospital of their choice (when operationally feasible) unless the patient is unstable.

All patients whose condition is judged to be unstable will be transported to the closest appropriate receiving facility.

If several hospitals are within the same approximate distance from the scene, allow the patient, and/or patients' family to select the receiving facility of their choice.

For transport destination of STROKE, STEMI, TRAUMA or OB (>20 weeks) patients, refer to the appropriate protocol.

Contact Medical Control with any concerns or questions

Physician on Scene

The control of the scene of an emergency should be the responsibility of the individual in attendance who is the most appropriately trained in providing pre-hospital stabilization and transport. As a representative of the Medical Director of an EMS system, the Paramedic/EMT fulfills that role.

Occasions will arise when a physician on the scene will desire to direct pre-hospital care. A standardized scheme for dealing with these contingencies will optimize the care given to the patient.

The physician desiring to assume care of the patient must:

- Provide documentation of his/her status as a physician (MD or DO) to include a current copy of his/her license to practice medicine in Wisconsin.
- Assume care of the patient and allow documentation of his/her assumption of care on the patient care report.
- Agree to accompany the patient during transport to the hospital.

Contact with OLMC must be established as soon as possible. The OLMC Physician must agree and relinquish the responsibility of patient care to the physician on scene in order for care to be transferred.

Orders provided by the physician assuming responsibility for the patient should be followed as long as they do not, in the judgment of the paramedic, endanger patient well being. The paramedic may request the physician attend to the patient during transport if the suggested treatment varies significantly from standing orders.

If the physician's care is judged by the paramedic to be potentially harmful to the patient, the paramedic should:

- Politely voice his/her objection
- Immediately place the on-scene physician in contact with the OLMC Physician

When conflicts arise between the physician on scene and the OLMC Physician, EMS personnel should:

- Follow the directives of the OLMC Physician
- Offer no assistance in carrying out the order in question; offer no resistance to the physician performing this care.
- If the physician on scene continues to carry out the order in question, offer no resistance and enlist the aid of law enforcement.

All interactions with physicians on the scene must be completely documented in the Patient Care Report, including the name and license number of the on scene physician.

Patient Care During Transport

The following situations shall require >1 attendant in the back of an ALS unit.

- Medical or Traumatic cardiac arrest or post-resuscitation care
- Patients requiring active airway assistance (ETT, LTA, BVM)
- Imminent delivery
- For scenarios not covered above:
 - ⇒ If the provider requests a second attendant.
- A second attendant is not required if there will be an unacceptable delay in transport.

Note: A paramedic student or EMT can assist in attending ALS patients, but shall only be counted as the “second attendant” when determined appropriate by the primary paramedic attendant.

Patient Care Standards During Interfacility Transport

- Although primary responsibility is not for interfacility transports, situations may arise necessitating such transport
- Regardless of the provider, interfacility transport requires unique skills and capabilities, both in clinical and operational coordination. Adhere to the following standards for all interfacility transports:
- Interfacility transport decisions (including but not limited to, transport staffing, equipment and transport destination) should be made on the patient's medical needs.
- Match provider skills and equipment with patient care needs.
- Coordination between hospitals and interfacility transporters is essential before transport is initiated to ensure that patient care is provided at the appropriate level and does not exceed the capabilities of the interfacility transport provider.
- If EMS crewmembers are not capable/skilled in managing devices or medications, or if the devices/medications are not listed in these protocols and must be continued during transport, an adequately trained care provider from the transferring facility whose credentials are acceptable to the transporting agency must accompany the patient during transport.

Contact Medical Control with any concerns or questions

Radio Report Format

For all patients transported by EMS, radio contact should be made with the receiving facility prior to arrival. When possible, in order to provide sufficient notification of the patient's condition and estimated time of arrival, radio contact should be made at least 5 minutes prior to arrival.

Use the following triage categories and triage levels (colors) to assist the receiving facility prioritizing incoming calls.

Triage Categories

Categories	Definitions
Trauma	Indicates patient is a trauma patient
Medical	Indicates patient is a medical patient
Red	High acuity of illness or injury, unstable
Yellow	Serious condition, but not critical
Green	Low acuity of illness or injury
STEMI Alert	Meets STEMI criteria per Chest Pain protocol
Stroke Alert	Meets Stroke Alert criteria as per Stroke Protocol
Pediatric	Indicates patient is ≤ 12 years of age (medical) or less than 18 years of age (trauma)
Haz-Mat	Indicates patient was involved in a Haz-Mat incident
Code/PNB	Cardiopulmonary Arrest
MD's Orders	Indicates physician orders are needed

Radio Report Format

Radio Call to an Emergency Department

- Begin each transmission with the following:
 - ⇒ Agency name and unit number
 - ⇒ Triage category and triage level (e.g. Medical Red, STEMI Alert)
 - ⇒ Estimated time of arrival
- After the receiving facility acknowledges the initial information, give a concise report which include the following:
 - ⇒ Repeat the triage category and triage level
 - ⇒ Age and gender of patient
 - ⇒ Chief Complaint or problem
 - ⇒ Provide pertinent detail as to the following:
 - Vital signs
 - Glasgow Coma Score/level of consciousness
 - Mechanism of injury (if trauma)
 - Description of injuries (if trauma)
 - Treatment provided or under way
 - Any anticipated delay in transport (e.g. extrication)

Medical Control Contact

- Contact OLMC for any additional orders or with questions needed to meet the patient's needs during on-scene care or transport.
- Any quality concerns involving OLMC should be forwarded to the Office of the Medical Director for review as soon as possible.

Transfer of Care at Hospitals

Once on hospital property, the receiving facility assumes responsibility for all further medical care delivered to EMS transported patients. Dane County ALS personnel are not authorized to follow pre-hospital protocols after arrival at an ED and DCALS Medical Control should not be contacted for orders.

Exceptions to this should occur only in the following circumstances:

- Life-threatening situations such as cardiac arrest, airway emergencies or imminent delivery of a newborn.
- Continuation of treatment started prior to arrival (i.e. nebulizers, CPAP, IV fluids)
- When specifically instructed to continue care by the ED physician (when possible document the physician's name and the time the verbal order was given)

To assure all known pertinent information is conveyed to the hospital staff, crews should interface with nursing staff within 2 minutes of arrival to give a verbal report. Transporting personnel shall provide to the receiving facility all known pertinent incident; patient identification and patient care information at the time the patient is transferred. In addition turn over all pre-hospital 12 lead EKGs to the ED staff. Patient care reports may be transmitted by physical (paper) means or electronic means.

Authorized Pharmaceuticals

Generic Name	Trade Name	Route
Adenosine	Adenocard	IV/IO
Albuterol	Proventil	Nebulized
Amiodarone	Cordarone	IV/IO
Aspirin		PO
Atropine		IV/IO
Calcium Chloride		IV/IO
Dextrose (5%, 12.5%, 25%, %50%)		IV/IO
Diazepam	Valium, Diastat	PR/IM
Diltiazem	Cardizem	IV/IO
Diphenhydramine	Benadryl	IV/IO/IM
Dopamine	Intropin	IV/IO
DuoDote Kit		IM
Epinephrine 1:1,000	Adrenaline	IM
Epinephrine 1:10,000	Adrenalin	IV/IO
Etomidate	Amidate	IV/IO
Famotidine	Pepcid	IV/IO
Fentanyl	Sublimaze	IV/IO/IN
Glucagon	GlucaGen	IV/IM
Glucose, Oral	Glucose	PO
Haloperidol	Haldol	IM
Hydroxycobalmin	CyanoKit	IV/IO
Ipratropium Bromide	Atrovent	Nebulized
Ketamine	Ketalar	IM
Lidocaine 2%	Xylocaine	IV/IO
Lorazepam	Ativan	IV/IM
Magnesium Sulfate 10%		IV/IO
Mark 1 Kit		IM
Methylprednisolone	Solu-Medrol	IV/IO
Midazolam	Versed	IV/IM/IN
Morphine Sulfate		IV/IO
Naloxone	Narcan	IV/IO/IM/IN
Nitroglycerin	Nitrostat, Nitrolingual	SL
Ondansetron	Zofran	IV/IO/ODT
Rocuronium	Zemuron	IV/IO
Sodium Bicarbonate 8.4%, 4.2%		IV/IO/Nebulized
Succinylcholine	Anectine	IV/IO
Thiamine		IV/IO
Tetracaine	Pontocaine	Ocular
Vasopressin	Pitressin	IV/IO

General Approach to All Adult Patients

The following measures will serve as the “*General Patient Care Protocol—Adult*” and apply to the management of all adult patients.

All Providers

- Establish patent airway
- Provide Supplemental oxygen if any respiratory signs or symptoms present
- Record and monitor vital signs
- Record Blood Glucose Level if any weakness, altered mental status or history of diabetes
- Nothing by mouth, unless patient is a known diabetic with hypoglycemia and is able to self-administer oral glucose paste, or a glucose containing beverage:
 - ⇒ Glucose paste 15 g or other oral glucose agent (e.g. orange juice) if patient alert enough to self administer oral agent

Advanced Life Support

- When condition warrants (specified as “Full ALS Assessment and Treatment “ in individual protocols)
 - ⇒ Advanced airway/ventilatory management as needed
 - ⇒ Perform cardiac monitoring
 - ⇒ Evaluate 12-lead ECG if chest pain, abdominal pain above the umbilicus or ischemic equivalent symptoms
 - ⇒ Record and monitor continuous O2 saturation and Capnography (if available)
 - ⇒ IV 0.9% NaCl TKO/KVO or IV lock
 - If evidence of dehydration (tachycardia, dry mucous membranes, poor skin turgor) or hypovolemia, administer boluses of 0.9% NaCl at 250 ml (up to 500 ml total if no hypotension)
 - If BP<90 mmHg systolic, administer boluses of 0.9% NaCl at 250 ml until systolic BP>90 mmHg, max individual dose 2 L
 - Contraindicated if evidence of congestive heart failure (e.g. rales)
 - If Hypoglycemic (Blood glucose < 70 mg/dL) with IV access:
 - Dextrose 12.5-25 g slow IV
 - Repeat Dextrose 12.5-25 g once if blood glucose <70 mg/dL after 10 minutes

- Administer Thiamine 100 mg IV if patient appears malnourished

⇒ If Hypoglycemic (Blood glucose < 70 mg/dL) without IV access

- Glucose paste 15 g or other oral glucose containing agent (e.g., orange juice) if patient alert enough to self administer oral agent
- If unable to take oral glucose administer Glucagon 1 mg IM

⇒ Transport patient to nearest appropriate Emergency Department

⇒ Minimize on-scene time when possible

Contact Medical Control with any additional orders or questions

Abdominal Pain/GI Bleeding

All Providers

- General Patient Care Protocol—Adult
- Nothing by mouth

Advanced Life Support

- Full ALS Assessment and Treatment
- If pain is above the umbilicus, perform cardiac monitoring and 12-lead EKG, refer to **Chest Pain Protocol** if indicated.
- For Patients with severe nausea or vomiting:
 - ⇒ Ondansetron (Zofran), 4 mg IV/IM/Oral Disintegrating Tablet (ODT)
- Refer to **Pain Management Protocol** if indicated

Contact Medical Control for any additional orders or questions

Airway Emergencies: Adult Dyspnea

All Providers

- General Patient Care Protocol—Adult
- Supplemental oxygen to maintain SPO₂ > 92%
 - ⇒ Albuterol (Proventil) 2.5 mg/3 ml and Ipratropium Bromide 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer, if wheezing or history of Asthma/COPD.
- Perform obstructed airway procedures per BLS standards.

Advanced Life Support

- Full ALS Assessment and Treatment
- Observe for signs of impending respiratory failure: Refer to **Airway Management Protocol** if indicated:
 - ⇒ Hypoxia (O₂ sat < 90%) not improved with 100% O₂
 - ⇒ Poor ventilatory effort
 - ⇒ Altered mental status/decreased level of consciousness
 - ⇒ Inability to maintain patent airway

Acute Bronchospasm (wheezing with or without history of Asthma or COPD)

- Mild Symptoms:
 - ⇒ Albuterol (Proventil) 2.5 mg/3 ml and Ipratropium Bromide 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer if not already given
- May repeat Albuterol (Proventil) PRN for continued wheezing
- Moderate Symptoms:
 - ⇒ As for mild symptoms, additionally:
 - Methylprednisolone (Solumedrol) 125 mg IV if wheezing persists after 1st nebulizer treatment
 - ⇒ Consider CPAP if symptoms moderate to severe
 - ⇒ Use settings specified in procedure manual for Asthma/COPD
- Severe Symptoms (not speaking, little or no air movement):
 - ⇒ As above, additionally:
 - Epinephrine 0.3 mg 1:1000 IM
 - OLMC if age >50, HR >150 or history of CAD
 - Magnesium Sulfate 2 g IV in 100 ml D5W over 10 min
 - Do not use if CHF or history of Renal Failure

Acute Pulmonary Edema Suspected

- (History of CHF, peripheral edema elevated SBP)
- Nitroglycerin 0.4 mg SL every 3 min:
 - ⇒ Contraindicated if SBP <90 mmHg
 - ⇒ Contraindicated if use of a Phosphodiesterase-5 (PDE-5) inhibitor within last 24 hours (Viagra, Levitra); 48 hours (Cialis)
- Aspirin 324 mg PO
- Consider CPAP if symptoms moderate/severe:
 - ⇒ Use settings specified in procedure manual for CHF/Pulmonary Edema
- If SBP > 150 consider Morphine Sulfate 5-10 mg IV
- For Hypotension (systolic BP <90 mmHg):
 - ⇒ Consider Dopamine infusion at 5-20 mcg/kg/min titrated to maintain SBP >90 mmHg
- If severe nausea or vomiting:
 - ⇒ Ondansetron (Zofran) 4 mg IV/IO
- For bronchospasm (wheezing) associated with Acute Pulmonary Edema:
 - ⇒ Albuterol (Proventil) 2.5 mg/3 ml and Ipratropium Bromide 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer
 - ⇒ May repeat Albuterol (Proventil) PRN for continued wheezing
- Consider **Airway Management Protocol**

Carbon Monoxide Poisoning

- Refer to **Overdose and Poisoning Protocol**

Foreign Body Obstruction Suspected

- Perform Obstructed Airway Procedures per BLS Standard
- Attempt suction
- Attempt removal with Magill forceps under direct visualization with laryngoscope
- Observe for signs of impending respiratory failure
 - ⇒ Refer to **Airway Management Protocol** if indicated

Drowning/Near Drowning

- Full ALS Assessment and Treatment
- Spinal Immobilization if indicated
- Protect from heat loss
- Patients may develop delayed onset respiratory symptoms:
 - ⇒ Consider CPAP for patients with significant dyspnea or hypoxia
 - ⇒ **Airway Protocol** as needed
 - ⇒ Refer to appropriate protocol if cardiac arrest present

Contact Medical Control for any additional orders or questions

• Acute Bronchospasm: Contact Medical Control prior to Epinephrine administration if:

- **Age > 50 years**
- **Heart Rate >150**
- **History of Coronary Artery Disease**

Airway Emergencies: Adult Airway Management

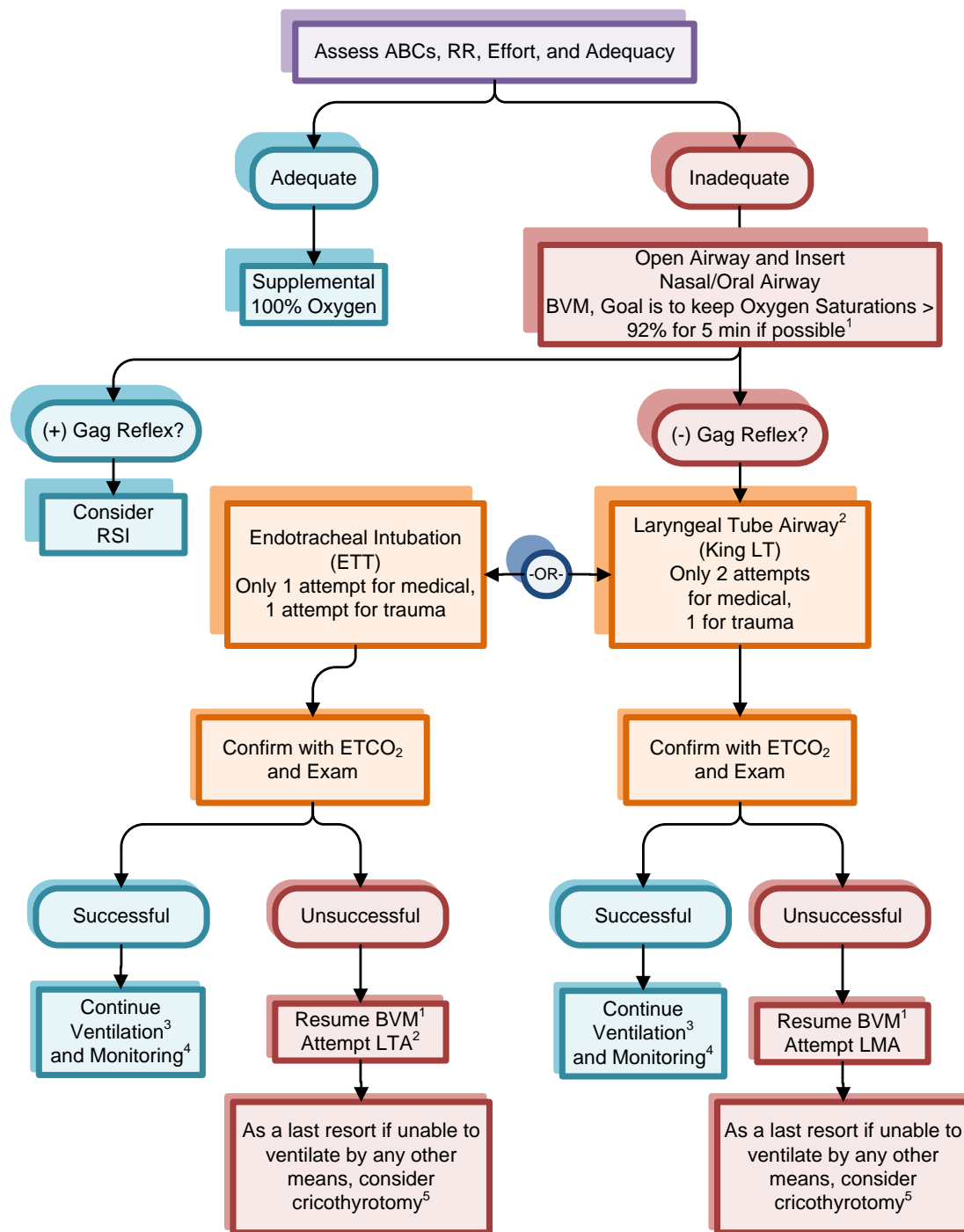
All Providers

- General Patient Care Protocol—Adult
- Supplemental oxygen to maintain $SPO_2 > 92\%$
- If suspicion of trauma, maintain C-spine immobilization.
- Suction all debris, secretions from the airway.
- Perform Basic Airway Maneuvers: open airway, nasal/oral airway; BVM if needed.
 - ⇒ BVM:
 - Ventilate once every 5-6 seconds (10-12 times/minute)
- If signs of airway obstruction refer to appropriate protocol
- If patient does not respond to above measures or deteriorates consider advanced airway placement

Advanced Life Support

- Full ALS Assessment and Treatment
- Monitor oxygen saturation and end-tidal CO_2 continuously
- Consider CPAP if protecting airway and awake
- Follow algorithm if invasive airway intervention is needed (LTA/ETT/LMA):
 - ⇒ Apnea
 - ⇒ Decreased level of consciousness with respiratory failure (i.e. hypoxia [O₂ sat < 90%] not improved by 100% oxygen, and/or respiratory rate < 8)
 - ⇒ Poor ventilatory effort (with hypoxia not improved by 100% oxygen)
 - ⇒ Unable to maintain patent airway

Airway Emergencies: Adult Airway Management



1. At any step of the airway algorithm, effective BVM ventilation is an acceptable level of airway management.
2. Place an oral-gastric tube via insertion port on LTA; attach to low continuous suction.
3. Components of effective ventilation include oxygenation, chest rise and fall, adequate lung sounds and the presence of an alveolar waveform on capnography.
4. Monitor ETCO₂, oxygen saturation and assess for effective ventilation continuously.
5. Attempt cricothyrotomy only after all other ventilation methods have failed.
6. If patient condition allows, another paramedic may attempt a non-visualized airway prior to performing a surgical airway.

Following placement of the ETT/LTA/LMA confirm proper placement:

- ⇒ Assess for absence of epigastric sounds, presence of breath sounds, and chest rise and fall
- ⇒ Observe for presence of alveolar waveform on capnography
- ⇒ Record tube depth and secure in place using a commercial holder if applicable
- ⇒ Utilize head restraint devices (i.e. “head-blocks”) or rigid cervical collar and long spine board as needed to help secure airway device in place

Capnography/ETCO₂ Monitoring

- Digital capnography (waveform) is the system standard for ETCO₂ monitoring.
- With the exception of on-scene equipment failure, patients should not be routinely switched from digital capnography (monitor) to a colorimetric device for monitoring end-tidal CO₂.
- In the event digital capnography is not available due to on-scene equipment failure, continuous colorimetric monitoring of ETCO₂ is an acceptable alternative.
- Continuous ETCO₂ monitoring is a MANDATORY component of invasive airway management.
 - ⇒ If ETCO₂ monitoring cannot be accomplished by either of the above methods, the invasive device MUST be REMOVED, and the airway managed non-invasively.
 - ⇒ If an alveolar waveform is not present with capnography (i.e. flat line), briefly check the filter line coupling to assure it is securely in place then remove the ETT/LMA or LTA and proceed to the next step in the algorithm.

Airway Emergencies: Rapid Sequence Airway

Under no circumstances should transport be delayed for RSA if the additional time to perform the procedure is greater than the transport time.

2 PARAMEDICS ARE REQUIRED AT ALL TIMES

All Providers

- General Patient Care Protocol—Adult
- Preoxygenate with 100% oxygen
- Basic Airway maneuvers: open airway, nasal/oral airway; BVM

Advanced Life Support

- Full ALS assessment and treatment
- Simultaneously contact OLMC
- Assess for Indications:
 - ⇒ Age ≥ 18 unless specific permission given prior to procedure by medical control
 - ⇒ Need for invasive airway management in the setting of an intact gag reflex or inadequate sedation to perform non pharmacologically assisted airway management:
 - Apnea
 - Decreased level of consciousness with respiratory failure (i.e. hypoxia [O_2 sat $< 90\%$] not improved by 100% oxygen, and/or respiratory rate < 8)
 - Poor ventilatory effort (with hypoxia not improved by 100% oxygen)
 - Unable to maintain patent airway by other means
 - Burns with suspected significant inhalation injury
- Preoxygenate 100% oxygen via NRB for at least 5 min or 8 Vital Capacity (deep) breaths with 100% O_2
 - ⇒ Only assist ventilations with BVM if patient's ventilations are inadequate or if hypoxemic (O_2 Saturation $< 92\%$ on supplemental oxygen)
- Assisted ventilations increase risk of aspiration during laryngoscopy
- Patients cannot have any contraindications to succinylcholine or other RSA drugs:
 - ⇒ Inability to ventilate via BVM
 - ⇒ Suspected Hyperkalemia

- ⇒ Myopathy or neuromuscular disease
- ⇒ History of Malignant Hypothermia
- ⇒ Recent crush injury or major burn (>48 hours after injury)
- ⇒ End Stage Renal Disease
- ⇒ Recent Spinal Cord Injury (72 hours-6 months)

Procedure

- **Preparation** (T-8 minutes):
 - ⇒ Monitoring (continuous ECG, SpO₂, Blood Pressure)
 - ⇒ 2 Patent IV's required (IO is acceptable)
 - ⇒ Functioning laryngoscope and BVM with highflow O₂
 - ⇒ Endotracheal Tube(s), stylet, syringe(s)
 - ⇒ LTA(s) and appropriate syringe(s)
 - ⇒ Alternative/rescue airway (LMA and surgical airway kit) immediately available
 - ⇒ All medications drawn up and labeled (including post procedure sedation)
 - ⇒ Suction: on and functioning
 - ⇒ End-Tidal CO₂ device on and operational (colorimetric immediately available as a back up only)
 - ⇒ Assess for difficult airway—LEMON
- **Preoxygenation** (T-5 minutes):
 - ⇒ 100% oxygen via NRB for 5 minutes or 8 Vital Capacity breaths (Deep breaths) via NRB or BVM.
 - ⇒ Minimize BVM to decrease gastric distention and risk of vomiting/aspiration.
- **Pretreatment** (T-3 minutes):
 - ⇒ Evidence of head injury or stroke:
 - Lidocaine 1.5 mg/kg IV/IO (max 150 mg)
 - ⇒ Begin cricoid pressure/Sellick's maneuver
- **Paralysis and Induction** (T + 0 minutes):
 - ⇒ Etomidate 0.3 mg/kg IV/IO (max dose 20 mg)
 - ⇒ Succinylcholine 2 mg/kg IV/IO (max dose 200 mg)
- **Placement with Proof** (T + 30 seconds):
 - ⇒ Place LTA or ETT
 - ⇒ Confirm with:

- End Tidal CO₂ waveform
 - Auscultation
 - Physical findings
- ⇒ Secure device, note position
- **Post-Placement Airway Management** (T + 60 seconds):
 - ⇒ Sedation
 - Morphine Sulfate 3 mg IV/IO **AND** Midazolam 3 mg IV/IO after tube confirmed with ET_{CO}₂ (check BP prior to administration):
 - May repeat X 2 as needed for sedation
 - ⇒ If additional sedation needed and transport time is > 10 minutes consider:
 - Rocuronium 1 mg/kg IV/IO

Contact Medical Control for any additional orders or questions

SIMULTANEOUSLY CONTACT MEDICAL CONTROL

Preparation (T-8 minutes)

- Monitoring (continuous ECG, SpO₂, Blood Pressure)
- 2 patent IVs
- Functioning Laryngoscope and BVM with highflow O₂
- Endotracheal tube(s), stylet, syringe(s)
- LTA(s) and appropriate syringe(s)
- Alternative/Rescue Airway (LMA and surgical airway kit) immediately available
- All medications drawn up and labeled (including post-procedure sedation)
- Suction--turned on and functioning
- End Tidal CO₂ device on and operational (colorimetric immediately available as back-up only)
- Assess for difficult airway--LEMON

Preoxygenate

100% O₂ x 5 minutes (NRB) or 8 VC breaths with 100% O₂ (BVM/NRB)

Pretreatment (T-3 minutes)

- Evidence of head injury or stroke
- Lidocaine 1.5 mg/kg IV/IO (max 150 mg)
- Begin cricoid pressure/Sellick's maneuver

Paralysis and Induction (T=0)

- Etomidate 0.3 mg/kg (max 20 mg)
- Succinylcholine 2 mg/kg (max 200 mg)

Placement with Proof (T+30 seconds)

- Place LTA/ETT
- Confirm with:
 - End Tidal CO₂ waveform
 - Auscultation
 - Physical Findings
- Secure Device, note position

Post-Placement Management (T+1 minute)

Sedation: Morphine 3 mg IV/IO **AND** Midazolam 3 mg IV/IO, repeat X2 as needed.
If additional needed and transport time > 10 minutes: Rocuronium 1 mg/kg IV/IO

Airway Emergencies: Failed Airway

When in failed airway scenario, immediate transport to the nearest emergency department is required

Contact Medical Control

All Providers

- General Patient Care Protocol—Adult
- If ventilation ineffective with single person BVM, place nasal/oral airway and begin two-person BVM.
- If unable to ventilate effectively with basic airway maneuvers using BVM and patient has no gag reflex, place LTA.

Advanced Life Support

- Full ALS Assessment and Treatment
- Simultaneously notify OLMC
- Failed Intubation/LTA/LMA
- Attempt ventilation with BVM and oral/nasal airway:
 - ⇒ Acceptable air exchange:
 - Continue with BVM, rapid transport indicated
 - Monitor oxygen saturation, end tidal carbon dioxide and cardiac parameters continuously
 - ⇒ Unacceptable air exchange:
 - Place LTA/LMA (if not previously attempted)
 - ◇ Acceptable air exchange:
 - Monitor oxygen saturation, end tidal carbon dioxide and cardiac parameters continuously
 - ◇ No air exchange:
 - Can't intubate/place advanced airway/can't ventilate situation
 - Percutaneous Cricothyrotomy (Surgical Airway)

Allergic Reaction

All Providers

- General Patient Care Protocol—Adult
- If wheezing present:
 - ⇒ Albuterol (Proventil) 2.5 mg/3 ml and Ipratropium Bromide 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer
- Assist patient in self-administration of previously prescribed epinephrine auto-injector (Epi-Pen)

Advanced Life Support

- Full ALS Assessment and Treatment
 - Mild Reaction (Itching/Hives)
 - Diphenhydramine (Benadryl) 50 mg IV/IM/IO
 - Famotidine 20 mg in 100 ml D5W, IV Piggyback over 15 min

Moderate Reaction (Dyspnea, Wheezing, Chest Tightness)

As for mild symptoms, additionally:

- Albuterol (Proventil) 2.5 mg/3 ml and Ipratropium Bromide 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer, if not already given
 - ⇒ May repeat Albuterol PRN for continued wheezing
- Diphenhydramine (Benadryl) 50 mg IV/IM/IO (if not already given)
- Famotidine 20 mg in 100 ml D5W, IV Piggyback over 15 min (if not already given)

Severe Systemic Reaction (SBP <90mmHg, Stridor, Severe Respiratory Distress)

As for moderate symptoms, additionally:

- Epinephrine 1:1000, 0.3 mg IM (OLMC for approval if age>50, HR>150, history of CAD)
 - ⇒ Albuterol (Proventil) 2.5 mg/3 ml via nebulizer
 - ⇒ May repeat PRN for continued wheezing
- Diphenhydramine (Benadryl) 50 mg IV/IM/IO (if not already given)
- Famotidine 20 mg in 100 ml D5W, IV Piggyback over 15 min (if not already given)
- Methylprednisolone (Solumedrol) 125 mg IV/IO

Imminent Cardiopulmonary Arrest

- As for severe systemic reaction, additionally:
 - ⇒ Epinephrine 1:10,000, 0.5 mg IV

Cardiac Arrest

- Refer to the appropriate protocol based on presenting rhythm
- In the setting of cardiac arrest, the following items should be performed in the post-resuscitative phase, when time allows:
 - ⇒ Albuterol (Proventil) 2.5 mg/3 ml via nebulizer
 - ⇒ May repeat (PRN for continued wheezing)
- Diphenhydramine (Benadryl) 50 mg IV/IO (if not already given)
- Famotidine 20 mg in 100 ml D5W, IV Piggyback over 15 min (if not already given)
- Methylprednisolone (Solumedrol) 125 mg IV/IO (if not already given)

Contact Medical Control for any additional orders or questions

- **Epinephrine Infusion:**
 - ⇒ **Mix 2 mg (1:1000) in 250 ml NS**
 - ⇒ **Start at 2 mcg/min, maximum 10 mcg/min**

Altered Mental Status

All Providers

- General Patient Care Protocol—Adult
- Blood Glucose
 - ⇒ If hypoglycemic (Blood glucose < 70mg/dL)
 - Glucose paste 15 g or other oral glucose agent (e.g. orange juice) if patient alert enough to self-administer

Advanced Life Support

- Full ALS Assessment and treatment
- If hypoglycemic (Blood glucose < 70 mg/dL) with IV access:
 - ⇒ Dextrose 12.5-25 g IV
 - ⇒ May repeat as needed every 5-10 minutes to blood glucose >100 mg/dL
 - ⇒ If patient appears malnourished or is a known or suspected chronic alcoholic:
 - Thiamine 100 mg IV prior to glucose administration
- If hypoglycemic (Blood glucose < 70 mg/dL) without IV access:
 - ⇒ Glucose paste 15 g or other oral glucose agent (e.g. orange juice) if patient alert enough to self administer
- If hypoglycemic and unable to take oral glucose:
 - ⇒ Glucagon 1 mg IM
- If Drug (narcotic) overdose suspected:
 - ⇒ Naloxone (Narcan) 2 mg IVP every 3 minutes (maximum 8 mg)
 - Naloxone (Narcan) can be administered in 0.4 mg increments titrated to respiratory drive and level of consciousness
 - If IV access has not been established, Naloxone (Narcan) 2 mg IM/IN via mucosal atomizer device
- If Stroke suspected, see **Stroke Protocol**
- If Head Injury suspected, see **Trauma/Head Injury Protocol**
- If severely agitated and/or violent see **Behavioral Emergencies Protocol**
- If cardiac arrhythmia present see appropriate **Cardiac Arrhythmia Protocol**

Note: Patients presenting with altered mental status, who respond to Narcan are not candidates for informed refusal. Due to the relatively short half-life of Narcan, these patients are at risk for return of symptoms. These patients should be transported to the emergency department, regardless of an apparently normal mental status.

Contact Medical Control for any additional orders or questions

Behavioral Emergencies/Excited Delirium

All Providers

- General Patient Care Protocol—Adult
- Apply physical restraints if needed to ensure patient/crew safety. Adhere to procedure on Physical Restraint of Agitated Patients when this process is deemed necessary
- Blood Glucose Measurement
- Assess and treat for hyperthermia

Advanced Life Support

- When Chemical or Physical restraints are used, perform Full ALS Assessment and Treatment
- For patients with severe agitation compromising patient/crew safety, or for patients who continue to struggle against physical restraints:
 - ⇒ Haloperidol (Haldol) 5 mg IM if, ≤60 kg or 10mg IM if >60 kg
 - Avoid if recent history of MAO inhibitor use (e.g. Phenelzine, Tranylcypromine)
 - ⇒ Lorazepam (Ativan) 1-2 mg IM (can be combined in same syringe as Haldol)
- If concerns for Excited Delirium:
 - ⇒ 2 liters Normal Saline IV
- If cocaine/sympathomimetic toxicity strongly suspected:
 - ⇒ Lorazepam (Ativan) 1 mg IV/IM
 - ⇒ Repeat Lorazepam (Ativan) 1 mg IM/IV if adequate sedation not achieved on initial dose
- **Note: NEVER restrain or transport in prone position!**

**Contact Medical Control for all refusals or non-transport
Contact Medical Control for any additional orders or questions**

- **Ketamine 4 mg/kg IM**

Bites and Envenomations

Basic Life Support

- General Patient Care Protocol—Adult
- Irrigate/Cleanse wound with 0.9% NaCl (remove any large debris)
- Remove stinger if wasp/bee (if easily removed)
- Mark edematous area with pen and note time
- Immobilize affected part and remove distal jewelry
- Attempt to identify what caused bite and bring to Emergency Department if dead (use caution when handling dead snakes as envenomation has occurred secondary to reflex motor movement)

Advanced Life Support

- Full ALS Assessment and Treatment
- For hypotension (SBP<90 mmHg) not improved with fluid boluses up to 2L, 0.9% NaCl, or when fluid boluses are contraindicated:
 - ⇒ Dopamine infusion at 5-20 mcg/kg/min titrated to maintain SBP>90 mmHg
- For Black Widow spider envenomation with severe muscle spasms:
 - ⇒ Lorazepam (Ativan) 1mg IV/IM
- Consider **Allergic Reaction Protocol**
- Transport to closest facility

Contact Medical Control for any additional orders or questions

Cardiac Arrest: General Approach

General

- CCR is indicated in ADULT patients that have suffered cardiac arrest of a presumed cardiac nature. It is not indicated in those situations where other etiologies are probable (overdose, drowning, hanging etc.). In these instances CPR is indicated.
- CCR is not to be used on individuals less than 18 years of age.
- Successful resuscitation requires planning and clear role definition.
- In the event a patient suffers cardiac arrest in the presence of EMS (EMS witnessed Cardiac Arrest), the absolute highest priority is to apply the AED/Defibrillator and deliver a shock immediately if indicated.
- Reassess airway frequently and with every patient move.
- DO NOT INTERRUPT CHEST COMPRESSIONS!
- Designate a “code leader” to coordinate transitions, defibrillation and pharmacological interventions. “Code Leader” should not have any procedural tasks. If the “code leader” is needed for a specific task, a new leader must be designated.

All Providers

- General Patient Care Protocol
- Check responsiveness and check for a carotid pulse
- Call “patient contact” to dispatch when you arrive at the patient’s side
- If adequate bystander compressions ongoing, continue compressions until monitor pads in place and monitor charged. Stop compressions for rhythm analysis (< 5 sec)
 - ⇒ If VT or VF (or AED Advises Shock), defibrillate
 - Call “first shock” time to dispatch
 - ⇒ If PEA/Asystole, go to appropriate protocol and resume compressions
- Immediately after defibrillation, resume chest compressions with a different operator compressing. Do not pause for post-shock rhythm analysis. Stop compressions only for signs of life (patient movement) or rhythm visible through compressions on monitor or pre-defibrillation rhythm analysis every 2 minutes
- If compressions are not being performed upon arrival or if compressions are not deemed adequate, immediately perform compressions at a rate of 100 compressions per minute for 2 minutes.

Cardiac Arrest: Asystole

Note: When Asystole is seen on the cardiac monitor, confirmation of the rhythm shall include a printed rhythm strip, as well as interpretation of the rhythm in more than one lead. Low amplitude V-Fib or PEA may be difficult to distinguish from asystole when using only the cardiac monitor for interpretation.

Advanced Life Support

- Follow **Cardiac Arrest—General Approach Protocol**
- Consider and treat possible causes

Potential Causes of Asystole	Treatment
<ul style="list-style-type: none">• Hypoxia	<ul style="list-style-type: none">• Secure airway and ventilate
<ul style="list-style-type: none">• Hypoglycemia	<ul style="list-style-type: none">• Dextrose 25 g IV/IO; repeat as needed to achieve blood glucose >70
<ul style="list-style-type: none">• Hyperkalemia (end stage renal disease)	<ul style="list-style-type: none">• Sodium bicarbonate 1 mEq/kg IV/IO• Calcium Chloride 1 g IV/IO
<ul style="list-style-type: none">• Hypothermia	<ul style="list-style-type: none">• Active re-warming
<ul style="list-style-type: none">• Tablets (drug overdose)	<ul style="list-style-type: none">• See below

- Epinephrine 1 mg IV/IO every 3-5 min during arrest
- Drug overdoses (see specific drug OD/toxicology section)
- Glucagon 3 mg IV/IO for calcium channel and B-blocker OD
- Calcium Chloride 1 g IV/IO for calcium channel blocker OD
 - ⇒ Avoid if patient on Digoxin/Lanoxin
- Sodium Bicarbonate 1 mEq/kg, IV/IO for Tricyclic antidepressant OD
- Naloxone (Narcan) 2 mg IV/IO for possible narcotic OD
- If no response to resuscitative efforts in 20 minutes (at least 2 rounds of drugs) consider discontinuation of efforts (see **Termination of Resuscitation Protocol**)

Contact Medical Control for any additional orders or questions

Cardiac Arrest: Pulseless Electrical Activity (PEA)

Advanced Life Support

- Follow **Cardiac Arrest—General Approach Protocol**
- Consider and treat possible causes

Potential Causes of PEA	Treatment
• Hypovolemia (most common)	• Normal Saline 1-2 liters IV/IO
• Hypoxia	• Secure airway and ventilate
• Hydrogen Ion (acidosis)	• Sodium Bicarbonate 1 mEq/kg IV/IO
• Hyperkalemia (end stage renal disease)	• Sodium Bicarbonate 1 mEq/kg IV/IO • Calcium Chloride 1 g IV/IO
• Hypothermia	• Active rewarming
• Tablets (drug overdose)	• See below
• Tamponade, Cardiac	• Normal Saline 1-2 liters IV/IO • Expedite transport
• Tension pneumothorax	• Needle thoracostomy
• Thrombosis, Coronary	• Expedite transport
• Thrombosis, Pulmonary	• Expedite transport

- Epinephrine 1 mg IV/IO every 3-5 minutes
- Consider transcutaneous pacing if bradycardic
- Do not discontinue compressions unless there is a definite pulse
- Drug overdoses (see specific drug in OD/toxicology section)
- Glucagon 3 mg IV/IO for calcium channel and B blocker
- Calcium Chloride 1 g IV/IO for calcium channel blocker
 - ⇒ Avoid if patient on Digoxin/Lanoxin
- Sodium Bicarbonate 1 mEq/kg, IV/IO for Tricyclic antidepressant OD
- Naloxone (Narcan) 2 mg IV/IO for possible narcotic OD
- If no response to resuscitative efforts in 20 minutes (at least 2 rounds of drugs) consider discontinuation of efforts (see **Termination of Resuscitation Protocol**)

Cardiac Arrest: Ventricular Fibrillation/ Pulseless Ventricular Tachycardia

Advanced Life Support

- Follow **Cardiac Arrest—General Approach Protocol**
- Defibrillate for persistent VF/VT
 - 200 J for initial biphasic shock, 360 J for subsequent shocks (if available)
 - ⇒ Continue Chest Compressions immediately after shock (do not stop for pulse or rhythm check)
 - ⇒ Call first defibrillation time to dispatch
- Analyze rhythm after 2 minutes of good CPR; If VF/VT persists:
 - ⇒ Defibrillate at 200 J (360 J if available)
 - ⇒ Continue compressions immediately after shock (do not stop for pulse or rhythm check)
- Epinephrine 1 mg IV/IO every 3-5 min during arrest
- Vasopressin 40 Units IV/IO with 1st Epinephrine dose only
- Analyze rhythm after 2 minutes of good CPR; If VF/VT persists:
 - ⇒ Defibrillate at 200 J (360 J if available)
 - ⇒ Continue Chest Compressions immediately after shock (do not stop for pulse or rhythm check)
- Amiodarone 300mg IV/IO bolus
 - ⇒ For persistent VT/VF give Amiodarone 150 mg IV/IO bolus on second round
- Continue cycle of Compressions & Drug → Rhythm Check → Compressions → Shock → Compressions & Drug → Rhythm Check → Compressions → Shock as needed
- Additional interventions to consider in special circumstances
 - ⇒ Magnesium Sulfate 2 g IV/IO push over 1-2 minutes only if suspected Polymorphous VT (torsades de pointes) or hypomagnesemic state (chronic alcohol or diuretic use)
 - ⇒ Sodium Bicarbonate 1 mEq/kg, IV/IO if suspected hyperkalemia (dialysis patient) or tricyclic antidepressant OD
 - ⇒ Calcium Chloride 1 g IV/IO if suspected hyperkalemia (dialysis patient)

Contact Medical Control for any additional orders or questions

Cardiac Arrest: Post Resuscitation Care

All Providers

- General Patient Care Protocol—Adult
- Maintain assisted ventilation as needed
- Supplemental 100% oxygen

Advanced Life Support

- Full ALS Assessment and Treatment
- Monitor ETCO₂, goal is 40, DO NOT HYPERVENTILATE
- For hypotension (systolic BP <90 mmHg) not improved by fluid boluses, or when fluid administration is contraindicated:
 - ⇒ Dopamine infusion at 5-20 mcg/kg/min titrated to maintain systolic BP >90 mmHg
- If VF/pulseless VT occurred during arrest **AND** Amiodarone was administered, no additional anti-arrhythmic is required unless arrhythmia recurs.
- If VF/VT reoccurs after previous conversion with Amiodarone 300 mg:
 - ⇒ Defibrillate and administer Amiodarone 150 mg IV/IO
- If patient becomes combative, administer:
 - ⇒ Lorazepam (Ativan) 1-2 mg slow IV/IO may repeat X 1 (maximum dose 4 mg)
- Consider **Therapeutic/Induced Hypothermia Protocol**
- Transport to nearest appropriate facility

Contact Medical Control for any additional orders or questions

Cardiac Arrest: Hypothermia Therapeutic/Induced

Most patients suffering from cardiac arrest with return of spontaneous circulation (ROSC) die with anoxic brain injury. Therapeutic hypothermia serves to improve the chance of a good neurologic outcome.

Criteria for inclusion:

- Witnessed cardiac arrest with ROSC
- Not pregnant
- Age \geq 18 years
- No evidence of trauma or intracranial hemorrhage
- Significant altered level of consciousness
 - ⇒ Not following commands
 - ⇒ No purposeful movement
 - ⇒ Incomprehensible speech
- No known surgery within the preceding 2 weeks
- No history of bleeding disorder
 - ⇒ Warfarin/Coumadin and Heparin are **NOT** contraindications
- Patient must have airway secured (LTA/ETT)

Advanced Life Support

- Full ALS Assessment and Treatment
- 12-Lead EKG
- Ensure all inclusion/exclusion criteria are met.
- If airway not secured and it **will not delay transport** to the appropriate receiving facility, perform RSA, refer to **Invasive Airway Management Protocol** as needed.
- Assess neurological status prior to intubation.
- Once airway secured/sedated, expose patient and apply ice packs to axilla, groin and neck.
- Administer Midazolam 1-2 mg every 3-5 minutes IV/IO to a max of 10 mg.
- Administer 30 ml/kg of cool saline (4C) to a max of 2 liters IV.
- If shivering, administer Rocuronium 1 mg/kg IV/IO.
- If systolic blood pressure $<$ 90 mmHg, initiate Dopamine infusion at 5-20 mcg/kg/min, titrate to SBP $>$ 90 mmHg.

- Closely monitor ventilation, target ETCO_2 to 40 mmHg, do not hyperventilate.
- If at any time there is loss of spontaneous circulation, discontinue cooling and go to the appropriate protocol.

Contact Medical Control for any additional orders or questions

Cardiac Arrest: Termination of Resuscitation

Note: When asystole is seen on the cardiac monitor, confirmation of the rhythm shall include a PRINTED rhythm strip, as well as interpretation of the rhythm strip in more than one lead. Low amplitude V-Fib or PEA may be difficult to distinguish from asystole when using only the cardiac monitor display for interpretation.

On-line Medical Control NOT Required

- The paramedic may terminate resuscitative efforts in non-hypothermic adults provided all 7 of the following criteria exist:
 - 1) Initial rhythm is asystole, confirmed in two leads on a printed strip
 - 2) Terminal rhythm is asystole confirmed in two leads on a printed strip
 - 3) Secure airway confirmed by digital capnography (ETT/LTA/LMA)
 - 4) At least two doses of Epinephrine have been administered
 - 5) At least two doses of Atropine have been administered
 - 6) Cardiac Arrest refractory to at least 20 minutes of ACLS
 - 7) Quantitative EtCO₂ value is <10 mmHg with effective CPR, after 20 minutes of ACLS

The paramedic has the discretion to continue resuscitation efforts despite the above criteria being met if scene safety, location, patient's age, time of arrest, or bystander input compels this decision

**DO NOT TERMINATE RESUSCITATION
IF PATIENT HAS BEEN MOVED TO THE AMBULANCE OR IF
TRANSPORT HAS BEEN INITIATED**

Contact Medical Control for any additional orders or questions

Cardiac Arrest: No Resuscitation Indicated

Resuscitation can be withheld in Medical Cardiopulmonary Arrest under the following circumstances:

- Adult patient \geq 18 years of age **AND**
- Pulseless, Apenic and no other signs of life present **AND**
- Asystole verified in two (2) leads **AND**
- Not exposed to an environment likely to promote hypothermia **AND**
- The presence of one or more of the following:
 - ⇒ Rigor mortis
 - ⇒ Decomposition of body tissues
 - ⇒ Dependent lividity **OR**
 - ⇒ When the patient has a valid State of Wisconsin DNR order/bracelet/wristband

If unknown DNR status or questions regarding validity of DNR status, initiate resuscitation and contact OLMC

Contact Medical Control for any additional orders or questions

Cardiac Arrhythmias: Atrial Fibrillation or Flutter

All Providers

- General Patient Care Protocol-Adult
- Supplemental oxygen

Advanced Life Support

- Full ALS Assessment and Treatment
- Do not delay treatment if patient is unstable by obtaining 12-lead ECG unless diagnosis is in question
- Stable or borderline – Systolic BP >90 mmHg and mild symptoms (chest pain, SOB or lightheadedness)
- No history of WPW:
 - ⇒ Diltiazem 0.25 mg/kg IV over 5 min (Max 20 mg per dose)
 - If unsuccessful after 10 min and SBP >100 mmHg
 - Diltiazem 0.35 mg/kg IV (max 20mg)
- History of WPW
 - ⇒ Amiodarone 150 mg IV in 100 ml D5W over 10 min
 - If unsuccessful and SBP>100 mmHg, may repeat one time
- Unstable (serious signs and symptoms-pulmonary edema, BP<90 mmHg systolic, altered consciousness) AND atrial fibrillation at a rate >150 beats/minute
- Sedation if patient condition and time allows (hold if SBP <90mmHg):
 - ⇒ Fentanyl 25-50 mcg and Midazolam 1-2 mg IV/IO
 - Titrate to maximum total dose of Fentanyl 200 mcg and Midazolam 4 mg
- Synchronized Cardioversion
 - ⇒ 1st energy level: 100 Joules
 - ⇒ If no response: 200 J
 - ⇒ If no response: 200 J (300 J if available)
 - ⇒ If no response: 200 J (360 J if available)

Contact Medical Control for any additional orders or questions

Cardiac Arrhythmias: Bradycardia

All Providers

- General Patient Care Protocol-Adult
- Supplemental oxygen

Advanced Life Support

- Full ALS Assessment and Treatment
- Do not delay transport if patient is unstable by obtaining a 12 lead ECG unless diagnosis is in question

Note: The following therapies are indicated only when serious signs and symptoms are present. If symptoms are mild, provide supportive care and expedite transport.

Symptomatic (SBP<90mmHg, altered mental status or severe chest pain)

- Atropine 0.5 mg IVP, Repeat every 3 minutes as needed (Maximum dose 0.04 mg/kg)
- If symptoms persist after Atropine or any delay in establishing IV:
 - ⇒ Initiate transcutaneous pacing using demand mode
 - ⇒ Start at lowest MA's; increase until electrical capture with pulses achieved
 - ⇒ Start rate at 70 or default and increase rate to achieve systolic BP >90mmHg (Maximum 100 beats/minute)
 - ⇒ Sedation if patient condition and time allows (hold if SBP<90 mmHg):
 - Fentanyl 25-50 mcg and Midazolam 1-2 mg IV/IO
 - Titrate to maximum total dose of Fentanyl 200 mcg and Midazolam 4 mg
 - ⇒ For hypotension (systolic BP <90 mmHg) not improved by above
 - Dopamine infusion at 5-20 mcg/kg/min titrated to maintain SBP >90 mmHg
 - ⇒ If above unsuccessful:
 - Epinephrine infusion at 2-10 mcg/min titrated to maintain SBP >90 mmHg

- ⇒ If drug induced, treat for specific drug overdose
- Calcium Chloride 1g IV/IO for calcium channel blocker OD
 - ◇ Contraindicated if patient on Digoxin/Lanoxin
 - Glucagon 3mg IV/IO for calcium channel blocker OD if no response to Calcium Chloride
 - Glucagon 3mg IV/IO for Beta Blocker OD
 - Naloxone (Narcan) can be given in 0.4 mg increments titrated to level of consciousness and respiratory drive
 - ◇ If IV access has not been established, Naloxone (Narcan) 2 mg IM or via Mucosal Atomizer Device
 - Sodium Bicarbonate 1 mEq/kg, IV/IO for Tricyclic antidepressant OD

Contact Medical Control for any additional orders or questions

Cardiac Arrhythmias: Supraventricular Tachycardia

All Providers

- General Patient Care Protocol—Adult
- Supplemental oxygen

Advanced Life Support

- Full ALS Assessment and Treatment
 - ⇒ Do not delay treatment if patient is unstable by obtaining 12-lead ECG unless diagnosis is in question

Stable or borderline (Ventricular rate >150)

- Vagal maneuvers (Valsalva or Cough)
- Adenosine Phosphate (Adenocard) 12 mg rapid IVP over 1-3 seconds with 20 cc Normal Saline flush
 - ⇒ If no response in 2 minutes, Adenosine Phosphate (Adenocard) 12 mg rapid IVP over 1-3 seconds with 20 cc Normal Saline flush

Unstable with serious signs and symptoms (Ventricular rate >150)

- May give brief trial of Adenosine 12mg rapid IVP over 1-3 seconds with 20 cc Normal Saline flush
- Sedation if patient condition and time allows (hold if SBP<90mmHg)
 - ⇒ Fentanyl 25-50 mcg and Midazolam 1-2 mg IV/IO
 - Titrate to maximum total dose of Fentanyl 200 mcg and Midazolam 4 mg
- Synchronized Cardioversion
 - ⇒ First energy level: 50 Joules
 - ⇒ If no response: 100 J
 - ⇒ If no response: 200 J
 - ⇒ If no response: 200 J (300 J if available)
 - ⇒ If no response: 200J (360 J if available)

Contact Medical Control for any additional orders or questions

- ◆ Diltiazem 0.25mg/kg slow IV over 5 min (Max 20mg)
 - NOT FOR USE WITH OR HISTORY OF WPW
- ◆ Amiodarone 150mg IV over 10 min

Cardiac Arrhythmias: Wide-Complex Tachycardia

All Providers

- General Patient Care Protocol-Adult
- Supplemental oxygen

Advanced Life Support

- Full ALS Assessment and Treatment
- Do not delay treatment by obtaining 12-lead ECG unless diagnosis is in question
- In general, assume unknown wide complex tachycardia, at rates over 150 represent ventricular tachycardia

Stable and SVT highly likely (rate >150)

- Adenosine Phosphate (Adenocard) 12 mg rapid IVP over 1-3 seconds with 20 cc Normal Saline flush
 - ⇒ If no response in 2 minutes, 12 mg rapid IVP over 1-3 seconds with 20 cc Normal Saline flush

Stable and unknown wide complex or ventricular tachycardia likely (rate >150)

- Amiodarone 150 mg in 100 ml D5W IV Piggyback over 10 minutes
 - ⇒ Repeat Amiodarone 150 mg in 100ml D5W IV Piggyback over 10 minutes every 15 minutes (Maximum of 450 mg total)

Unstable wide complex tachycardia (rate >150)

- Sedation if patient condition and time allows (hold for SBP <90 mmHg)
 - ⇒ Fentanyl 25-50 mcg and Midazolam 1-2 mg IV/IO
 - Titrate to maximum total dose of Fentanyl 200 mcg and Midazolam 4 mg
- Synchronized Cardioversion:
 - ⇒ 1st energy level 100 Joules
 - ⇒ If no response 200 J
 - ⇒ If no response 200 J (300 J if available)
 - ⇒ If no response 200 J (360 J if available)

- If delays in synchronization occur and condition is critical, go immediately to unsynchronized shocks
- If wide complex tachycardia reoccurs following electrical cardioversion:
 - ⇒ Amiodarone 150 mg in 100 ml D5W IV Piggyback, over 10 minutes, every 15 minutes (maximum 450 mg cumulative total dose)
- If hyperkalemia suspected in any wide complex tachycardia (e.g. renal failure patient) administer the following medications:
 - ⇒ Calcium Chloride 1g IV/IO
 - Contraindicated if patient on Digoxin/Lanoxin
 - ⇒ Sodium Bicarbonate 1mEq/kg IV/IO

Contact Medical Control for any additional orders or questions

Cardiac Arrhythmias: Polymorphous Ventricular Tachycardia (Torsades de Pointes)

All Providers

- General Patient Care Protocol-Adult
- Supplemental oxygen

Advanced Life Support

- Full ALS Assessment and Treatment
 - ⇒ Do not delay treatment if patient is unstable by obtaining a 12-lead ECG unless diagnosis is in question

Stable

- Magnesium Sulfate 2 g slow IV in 10 ml NS over 1-2 minutes
- If no response, Amiodarone 150 mg in 100 ml D5W IV Piggyback over 10 minutes
 - ⇒ Repeat Amiodarone 150 mg in 100 ml D5W IV Piggyback over 10 minutes every 15 minutes (Maximum of 450 mg total)

Unstable-or if no response to the above measures:

- Sedation if patient condition and time allows (hold if SBP < 90mmHg)
 - ⇒ Fentanyl 25-50 mcg and Midazolam 1-2 mg IV/IO
 - Titrate to maximum total dose of Fentanyl 200 mcg and Midazolam 4 mg
- Synchronized Cardioversion:
 - ⇒ 1st energy level 100 Joules
 - ⇒ If no response 200 J
 - ⇒ If no response 200 J (300 J if available)
 - ⇒ If no response 200 J (360 J if available)
- If delays in synchronization occur and condition is critical, go immediately to unsynchronized shocks

Contact Medical Control for any additional orders or questions

Chest Pain

All Providers

- General Patient Care Protocol—Adult
- Supplemental oxygen
- Aspirin 324 mg PO (unless documented Aspirin allergy)
- Assist patient in self-administration of previously prescribed Nitroglycerin
 - ⇒ Contraindicated if systolic BP < 90 mmHg
 - ⇒ Contraindicated if use of a Phosphodiesterase-5 (PED5) inhibitor within last 24 hours (Viagra [Sildenafil] or Levitra [Vardenafil])
 - This contraindication extends to 48 hours for Cialis (Tadalafil)
- Repeat patient assisted Nitroglycerin administration every 5 minutes as needed for continued chest pain (provided SBP remains > 90 mmHg) with assessment of patient before and after each NTG dose

Advanced Life Support

- Full ALS Assessment and Treatment
- Obtain 12-lead ECG within 5 minutes of arrival
 - Prior to transport notify receiving hospital as per **STEMI Alert Criteria**
- Identify the presence of ECG changes suggestive of Acute Myocardial Infarct (AMI)
 - ⇒ See **STEMI Alert** below
- For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses, or when fluid boluses are contraindicated
 - ⇒ Dopamine infusion at 5-20 mcg/kg/min titrated to maintain systolic BP > 90 mmHg

For suspected cardiac chest pain:

- Aspirin 324 mg PO chewed if patient is able to swallow and Aspirin is not contraindicated or given already
- Nitroglycerin 0.4 mg spray SL, every 5 minutes as needed for chest pain
 - ⇒ Contraindicated if systolic BP < 90 mmHg
 - ⇒ Contraindicated if use of a Phosphodiesterase-5 (PED5) inhibitor within last 24 hours (Viagra [Sildenafil] or Levitra [Vardenafil])
 - This contraindication extends to 48 hours for Cialis (Tadalafil)
 - ⇒ Use with caution in Acute Inferior Wall MI, or Right Ventricular infarct (ST elevation in V4R)

- IV access is recommended prior to administration of nitroglycerin in this subset
- ⇒ Be prepared to administer IV NS boluses at 250 mL if hypotension develops
- ⇒ Morphine Sulfate 2-4 mg slow IVP; repeat every 5 minutes as needed (Maximum 15 mg) or Fentanyl 25-50 mcg slow IV; repeat every 5 minutes (Maximum 200 mcg)
 - Contraindicated if systolic BP < 90 mmHg
 - Use with caution in right ventricular or posterior wall MI (ST elevation in posterior leads with marked depression in V1-V4)
- Runs of Ventricular Tachycardia:
 - ⇒ Amiodarone 150 mg in 100 ml D5W IV piggyback over 10 minutes
 - ⇒ Isolated PVCs do not require treatment
- For patients with severe nausea or vomiting:
 - ⇒ Ondansetron (Zofran) 4 mg slow IV

STEMI Alert (**ST** Segment Elevation **Myocardial** Infarction)

- A STEMI Alert will be instituted for patients having chest pain or ischemic equivalent symptoms for < 12 hours, and any of the following
 - ⇒ ST segment elevation ≥ 1 mm in two or more contiguous leads
 - ⇒ Computer interpretation of “**ACUTE MI**” on 12-lead ECG
 - ⇒ New Left Bundle Branch Block (confirmed by comparing to prior ECG)
- Patients meeting STEMI Alert criteria should be transported to a PCI (Percutaneous Coronary Intervention) capable hospital
 - ⇒ PCI Capable hospitals in the Madison Area:
 - University of Wisconsin Hospitals and Clinics
 - Meriter Hospital
 - St. Mary’s Hospital (not Sun Prairie ED)
- Patient preference should be taken into account when determining the transport destination.
- Early notification/ECG transmission to the receiving facility is imperative.

Contact Medical Control for any additional orders or questions

Hazardous Material Exposures: Basic Approach

Consult your agency's Hazardous Material Procedures before attempting to handle any toxic chemical exposure patient

Contact the Regional Poison Control Center (1-800-222-1222) upon identifying a possible toxic exposure or overdose

Chemical Burns and Dermal Exposure

All Providers

- General Patient Care Protocol—Adult
- Stop the burning process
- Remove all clothing prior to irrigation
- If a caustic liquid is involved, flush with copious amounts of water
- For chemical burns with eye involvement, immediately begin flushing the eye with normal saline and continue throughout assessment and transport
- If a dry chemical is involved, brush it off, then flush with copious amount of water
- Do not use water to flush the following chemicals:
 - ⇒ Elemental metals (sodium, potassium, lithium), and phenols
 - ⇒ Remove obvious metallic fragments from the skin
 - ⇒ Cover the burn with mineral oil or cooking oil
 - ⇒ Phenols penetrate the skin more readily when diluted with water
 - If available, dilute with the following (listed in order of efficacy)
 - Polyethylene glycol (PEG)
 - Glycerol
 - Vegetable Oil
 - ⇒ As a last resort use extremely large amounts of soap and water with continuous irrigation until all phenols are removed
- Apply a burn sheet or dry sterile dressing to burn areas
- For inhaled toxin with acute bronchospasm:
 - ⇒ Albuterol (Proventil) 2.5 mg/3 ml via nebulizer and Ipratropium Bromide 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer

Advanced Life Support

- Full ALS assessment and treatment
- For inhaled toxin with acute bronchospasm:
 - ⇒ Albuterol(Proventil) 2.5 mg/3 ml via nebulizer and Ipratropium Bromide 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer, if not already given
 - May repeat Albuterol (Proventil) PRN for continued wheezing
- Observe for signs of impending respiratory failure; Refer to the **Airway Management Protocol** if needed
- Refer to **Pain Management Protocol** if needed

Contact Medical Control for any additional orders or questions

- **For persistent burning sensation of the airways (after Albuterol/Atrovent) in the setting of Chlorine/Chloramine exposure:**
 - ⇒ **4.2 % Sodium Bicarbonate 5ml via nebulizer**
 - **Mix 2.5 ml of 8.4 % Sodium Bicarbonate with 2.5 ml of 0.9 % Normal Saline for a 5 ml nebulizer**

Hazardous Materials Exposure: Cyanide Toxicity and Smoke Inhalation

Cyanide poisoning may result from inhalation, ingestion or dermal exposure to cyanide containing compounds, including smoke from closed-space fires. The presence and extent of the poisoning are often unknown initially. Treatment decisions must be made on the basis of clinical history and signs and symptoms of cyanide intoxication.

Not all patients who have suffered smoke inhalation from a closed-space fire will have cyanide poisoning. Other conditions such as burns, trauma or other toxic inhalations (e.g. carbon monoxide) may be the cause of symptoms. When smoke inhalation is the suspected source of cyanide exposure assess the patient for the following:

- Exposure to fire or smoke in an enclosed space
- Presence of soot around the mouth, nose or oropharynx
- Altered mental status

Common Signs and Symptoms of Cyanide Toxicity

Symptoms	Signs
<ul style="list-style-type: none">• Headache• Confusion• Shortness of breath• Chest Pain or tightness• Nausea/Vomiting	<ul style="list-style-type: none">• Altered mental status• Seizures or coma• Dyspnea/tachypnea• Respiratory distress/apnea• Hypertension (early)• Hypotension (late)• Cardiovascular collapse/cardiac arrest

Advanced Life Support

- Supplemental 100% Oxygen
- Perform Full ALS Assessment and Treatment
- When clinical suspicion of Cyanide poisoning is high
 - ⇒ Administer Cyanokit[®] 5 g (two 2.5 g vials) IV/IO over 15 minutes
 - Use NaCl 0.9% as the diluent for Cyanokit[®] as per manufacturer instructions
 - Contraindicated in patients with known anaphylactic reactions to hydroxycobalamin or cyanocobalamin
- Expedite transport and treat other conditions as per appropriate protocol

Contact Medical Control for any additional orders or questions
♦ If severe symptoms persist (patient in extremis) contact
OLMC for consideration of repeat dosing of Cyanokit[®]

Hazardous Materials Exposure: Nerve Agent/WMD

SIMULTANEOUSLY ALERT OLMC

All Providers

- General Patient Care Protocol—Adult
- Ensure Scene safety and proper PPE
- Obtain history of exposure, observe for toxidromes
- Initiate triage/Decontamination
- Consider need for additional resources
- Mark 1 Kit/DuoDote as below
 - ⇒ Mark 1 and DuoDote Kits carried on response vehicles are for Responders ONLY. Their use referenced below implies that the WMD stockpile has been released and delivered to the scene

Advanced Life Support

- Full ALS Assessment and Treatment
- Assess symptoms
 - ⇒ Minor symptoms: salivation, lacrimation, visual disturbances
 - Adults-
 - Atropine 2 mg IV/IO/IM every 5 minutes until symptoms resolve
 - Pediatrics-
 - Atropine 0.02-0.05 mg/kg every 5 minutes until symptoms resolve
 - ⇒ Major symptoms: altered mental status, seizures, respiratory distress, respiratory arrest
 - Adults-
 - MARK 1 Kit X 3 IM IMMEDIATELY
 - Repeat Atropine 2 mg IV/IO/IM every 5 minutes until symptoms resolve
 - Lorazepam 1-2 mg IV/IO/IM or Diazepam Auto-injector 10mg IM
 - Pediatrics
 - ≤ 7 years old 1 MARK 1 Kit
 - 8-14 years old, 2 MARK 1 kits
 - ≥ 15 years old 3 MARK 1 Kits
 - Repeat Atropine 0.02-0.05 mg/kg IV/IO every 5 minutes until symptoms resolve
 - Lorazepam 0.1mg/kg IM/IV/IO

Contact Medical Control for any additional orders or questions

Hypertensive Emergencies

Focus on addressing the manifestations of hypertensive emergencies, such as chest pain or heart failure. Prehospital treatment of isolated hypertension may result in critical reductions in target organ perfusion due to uncontrolled lowering of blood pressure.

All Providers

- General Patient Care Protocol—Adult
- Supplemental oxygen

Advanced Life Support

- Full ALS Assessment and Treatment

Symptomatic:

- ⇒ Chest Pain present, refer to the specific protocol
- ⇒ For patients with altered mental status, signs of stroke or pulmonary edema, who are found to have elevated blood pressure, refer to the specific protocol

Asymptomatic:

- Provide supportive care

Contact Medical Control for any additional orders or questions

Hyperthermia

All Providers

- General Patient Care Protocol—Adult
- Move patient to cooler environment

Heat Cramps (Painful spasms of the extremities or abdominal muscles, normal mental status and vital signs)

- Oral fluids as tolerated
- Sponge with cool water

Heat Exhaustion (Dizziness, light-headedness, headache, irritability, normal or slightly decreased LOC, normal or decreased BP [hypovolemia], tachycardia, normal or slightly elevated temperature)

- Keep patient supine
- Supplemental 100% oxygen
- Remove clothing
- Sponge with cool water and fan

Heat Stroke (Marked alteration in LOC, extremely high temperature [often > 104] may be sweating or have red/hot/dry skin)

- Semi-reclining with head elevated 15-30°
- Supplemental 100% oxygen
- Rapid cooling (prevent shivering as it increases body temperature)
- Cold packs, sponge with cool water, fan

Advanced Life Support

- If symptoms are moderate to severe, perform Full ALS Assessment and Treatment
- Hyperthermia may result from cocaine or sympathomimetic toxicity
 - ⇒ If cocaine/sympathomimetic toxicity strongly suspected, refer to the **Cocaine/Sympathomimetic Protocol**
- Expedite Transport

Contact Medical Control for any additional orders or questions

Hypothermia

All Providers

- General Patient Care Protocol—Adult
- Remove wet clothing
- Measure core temperature, If < 95°F (35C), handle gently
- Warm blankets/warm temperature

Advanced Life Support

- Full ALS Assessment and Treatment
- If available, and no contraindications, administer warmed 0.9% Normal saline
- If Cardiac Arrest occurs with a core temp > 88°F
 - ⇒ Refer to appropriate protocol
 - ⇒ Prolong interval between drugs to 5 minutes
 - ⇒ If defibrillation is necessary, limit to one shock
 - ⇒ Continue CPR
- If cardiac arrest with core temp < 88°F
 - ⇒ Contact OLMC

Contact Medical Control for any additional orders or questions

Obstetrics / Gynecology

Perinatal Emergencies

Pregnancy-induced hypertension, pre-eclampsia and eclampsia are conditions typically encountered in late 2nd or 3rd trimester pregnancy, and less commonly in the postpartum period. Clinical manifestations may include elevated blood pressure (SBP > 160 mmHg), headache, confusion or agitation.

All Providers

- General Patient Care Protocol-Adult

Advanced Life Support

- Full ALS Assessment and Treatment
- Administer Magnesium Sulfate 4 g in 100 ml D5W IV over 10 minutes for either of the following:
 - ⇒ Systolic BP > 160 mm Hg on two readings
 - ⇒ Seizure activity
- For active seizures, in addition to Magnesium Sulfate choose one of the following options:
 - ⇒ Lorazepam (Ativan) 1-2 mg, slow IV/IO
 - OR-**
 - ⇒ If no IV access, Midazolam (Versed) 5 mg IM/IN
- For seizure not controlled by the above, or if seizure reoccurs after initial control, choose one of the following:
 - ⇒ Lorazepam (Ativan) 1-2 mg, slow IV/IO
 - OR-**
 - ⇒ If no IV access, Midazolam (Versed) 5 mg IM/IN
- Blood Glucose measurement
 - ⇒ If < 70 mg/dL administer Dextrose 12.5 g-25 g slow IVP

Vaginal Bleeding

1st or 2nd trimester or unknown pregnancy status

- Position of comfort, consider lateral recumbent position if hypotensive

3rd Trimester Bleeding (>26 weeks)

- Lateral recumbent position
- Do not place finger or hand inside birth canal during assessment

Advanced Life Support

- If bleeding moderate or heavy, perform Full ALS Assessment and Treatment
- If gestational age known to be < 20 weeks, transport to closest hospital
- If gestational age known or possibly \geq 20 weeks, transport to nearest OB receiving facility
- If BP < 90 mmHg systolic, administer boluses of 0.9% NaCl at 250 ml until systolic BP > 90 mmHg

Obstetrical Transport Destination

Patient known to be < 20 weeks gestation

- 1st day of last menstrual period < 20 weeks ago
- Available information verifying gestational age < 20 weeks (e.g., known due date)
 - ⇒ Refer to **Medical Transport Destination** for more information

Does not have to be an OB receiving facility

Patient known or possibly \geq 20 weeks gestation

- Imminent delivery or medically unstable mother:
 - ⇒ Transport to nearest ED (not nearest OB receiving facility)
- Non-traumatic abdominal, pelvic or back complaints, vaginal bleeding, spotting or any vaginal fluid leak or discharge:
 - ⇒ Transport to closest appropriate obstetric receiving facility
- Contact appropriate obstetric facility ED for radio report and any additional direction/assistance

Whenever possible, transport to patient's requested obstetric receiving facility (e.g. high risk pregnancy with pre-selected obstetrical destination) if patient not having imminent delivery

Appropriate Obstetric Receiving Facilities:

- Meriter Hospital
- St. Mary's Hospital—Madison Campus

Contact Medical Control for any additional orders or questions

Obstetrics / Gynecology: Childbirth

All Providers

- General Patient Care Protocol-Adult
- Supplemental oxygen
- Do not place fingers or hand inside the birth canal for assessment
- If presenting part is not the head (i.e., foot-, arm-, or buttock-first), immediately begin transport to the nearest OB receiving facility while further care continues

Delivery

- Slow, controlled delivery of head; apply gentle perineal pressure
- Observe for meconium staining
- If present, suction oral pharynx and nose as soon as head is delivered
- Following delivery, follow newborn resuscitation protocol
- Double clamp cord 10-12 inches from abdomen
- Cut cord between clamps
- Maintain body temperature
- Allow spontaneous delivery of placenta; do not apply traction to umbilical cord for placental delivery
 - ⇒ If placental delivery occurs, package in biohazardous waste bag and hand over to hospital staff upon arrival

Postpartum

- For neonate, see **Newborn Resuscitation Protocol**
- Assess for postpartum hemorrhage
- Gently massage abdominal wall overlying the uterine fundus until firm

Advanced Life Support

- Transport to nearest OB receiving facility
- See newborn resuscitation for care of the neonate

Contact Medical Control for any additional orders or questions

Overdose and Poisonings: General Approach

For any overdose or poisoning, contact should be made with the Regional Poison Control Center (RPCC) 1-800-222-1222. Whenever possible, determine the agent(s) involved, the time of the ingestion/exposure, and the amount ingested. Bring empty pill bottles, etc. to the receiving facility.

All Providers

- General Patient Care Protocol-Adults
- Nothing by mouth

Advanced Life Support

- Refer to the specific protocol when an agent has been identified or is strongly suspected

Contact Medical Control for any additional orders or questions

Overdose and Poisoning: Antidepressants

Category	Drugs	Overdose Effects
Tricyclic Antidepressants	<ul style="list-style-type: none"> • Amitriptyline (Elavil, Endep, Vanatrip, Levate) • Clomipramine (Anafranil) • Doxepin (Sinequan, Zonalon, Tridapin) • Imipramine (Tofranil, Impril) • Nortriptyline (Aventyl, Pamelor, Norventyl) • Desipramine (Norpramin) • Protriptyline (Vivactil) • Triimipramine (Surmontil) • Amitriptyline+Chlordiazepoxide (Limbitrol) 	<ul style="list-style-type: none"> • Hypotension • Anti-cholinergic effects (tachycardia, seizures, altered mental status, mydriasis) • AV conduction blocks (prolonged QT interval, wide QRS) • VT and VF
Other Cyclic Antidepressants	<ul style="list-style-type: none"> • Maprotiline (Ludiomil) • Amoxapine (Asendin) • Bupropion (Wellbutrin) • Trazodone (Desyrel, Trazorel) 	<ul style="list-style-type: none"> • Similar to tricyclics • Seizures • Seizures • Similar to tricyclics
Selective Serotonin Reuptake Inhibitors (SSRIs)	<ul style="list-style-type: none"> • Citalopram (Celexa) • Fluoxetine (Prozac) • Fluvoxamine (Luvox) • Paroxetine (Paxil) • Sertraline (Zoloft) 	<ul style="list-style-type: none"> • Hypertension, tachycardia, agitation, diaphoresis, shivering, tremor, muscle rigidity • Malignant Hyperthermia

Overdose and Poisoning: Tricyclic and Tetracyclic Antidepressant Overdose

Advanced Life Support

- Full ALS Assessment and Treatment
- For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses, or when fluid resuscitation is contraindicated:
 - ⇒ Dopamine infusion at 5-20 mcg/kg/min titrated to maintain systolic BP > 90 mmHg
- If wide QRS complex (≥ 0.10 sec), hypotension, or any arrhythmias:
 - ⇒ Sodium Bicarbonate 1 mEq/kg IV/IO
 - ⇒ Repeat Sodium Bicarbonate 1 mEq/kg IV/IO in 5-10 minutes
- If any of the following conditions occur, refer to the appropriate protocol:
 - ⇒ Polymorphous Ventricular Tachycardia
 - ⇒ Altered Mental Status
 - ⇒ Seizures

Contact Medical Control for any additional orders or questions

Overdose and Poisoning: Cholinergic Poisoning/Organophosphates

All Providers

- General Patient Care Protocol-Adult
- Wear protective clothing including masks, gloves and eye protection
 - ⇒ Toxicity to ambulance crew may result from inhalation or topical exposure
- Supplemental 100% oxygen
- Decontaminate patient
 - ⇒ Remove all clothing and contain run-off of toxic chemicals when flushing

Advanced Life Support

- Full ALS Assessment and Treatment
- For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses, or when fluid resuscitation is contraindicated
 - ⇒ Dopamine infusion at 5-20 mcg/kg/min titrated to maintain systolic BP > 90 mmHg
- If severe signs of toxicity, (severe respiratory distress, bradycardia, heavy respiratory secretions) do not rely on pupil constriction to diagnose or titrate medications):
 - ⇒ Atropine 2 mg IVP every 5 minutes, titrate dosing by assessing improvement in respiratory effort/bronchial secretions
 - ⇒ Consider Mark 1 Kit, see **Nerve Agent** protocol
- If any of the following conditions occur, refer to the appropriate protocol:
 - ⇒ **Altered Mental Status**
 - ⇒ **Seizures**

Contact Medical Control for any additional orders or questions

Overdose and Poisoning: Antipsychotics/Acute Dystonic Reaction

Examples of commonly used medications that may result in acute dystonic reactions:

- Haloperidol
- Prolixin
- Thorazine
- Prochlorperazine (Compazine)
- Promethazine (Phenergan)

Advanced Life Support

- Full ALS Assessment and Treatment
- For Dystonic reactions, administer
 - ⇒ Diphenhydramine (Benadryl) 25 mg IV
 - ⇒ Repeat Diphenhydramine 25 mg IV if inadequate response in 10 minutes

Contact Medical Control for any additional orders or questions

Overdose and Poisoning: Beta Blocker Toxicity

Examples of commonly used Beta Blocker medications:

Single Agent Medication	Combination Medication
<ul style="list-style-type: none"> • Propranolol (Inderal) • Atenolol (Tenormin) • Metoprolol (Lopressor, Toprol) • Nadolol (Corgard) • Timolol (Blocadren) • Labetolol (Trandate) • Esmolol (Brevibloc) 	<ul style="list-style-type: none"> • Corzide (Nadolol/bendroflumethlazide) • Inderide (Propranolol/HCTZ) • Lopressor HCT (Metoprolol/HCTZ) • Tenoretic (Atenolol/Chlorthalidone) • Timolide (Timolol/HCTZ) • Ziac (Bisoprolol/HCTZ)

Advanced Life Support

- Full ALS Assessment and Treatment
- For all patients with cardiovascular toxicity, defined by:
 - ⇒ Chest Pain, SBP < 90 mmHg or altered mental status, **AND**
 - ⇒ Heart Rate < 60 or 2nd or 3rd degree heart blocks
 - ⇒ Administer the following agents:
 - Atropine 0.5 mg IV/IO, may repeat X 2
 - ◇ use with caution in the setting of 2^o or 3^o heart block
 - If no response, Glucagon 3 mg IV/IO
 - ◇ If vomiting after Glucagon, administer Ondansetron (Zofran) 4 mg IV
 - If no response, begin Transcutaneous Pacing

Contact Medical Control for any additional orders or questions

Overdose and Poisonings: Calcium Channel Blockers

Examples of commonly used Calcium Channel Blocker medication:

- Amlodipine (Norvasc)
- Felodipine (Plendil, Renedil)
- Isradipine (DynaCirc)
- Nicardipine (Cardene)
- Nifedipine (Procardia, Adalat)
- Verapamil (Calan)
- Diltiazem (Cardizem)

Advanced Life Support

- Full ALS Assessment and Treatment
- For all patients with cardiovascular toxicity, defined by:
 - ⇒ Chest Pain, SBP < 90 mmHg or altered mental status, AND
 - ⇒ Heart Rate < 60 or 2nd or 3rd degree heart blocks
 - ⇒ Administer the following agents
 - Atropine 0.5 mg IV/IO, may repeat X 2
 - ◇ use with caution in the setting of 2^o or 3^o heart block
 - ⇒ If no response, administer Calcium Chloride 1 g IV/IO
 - Contraindicated if patient taking Digoxin (Lanoxin)
 - ⇒ If no response, may repeat Calcium Chloride 1 g IV/IO
 - ⇒ If no response, Glucagon 3 mg IV/IO
 - If vomiting after Glucagon administer Ondansetron (Zofran) 4 mg IV
 - ⇒ If no response, begin Transcutaneous Pacing

Overdose and Poisonings: Carbon Monoxide

All Providers

- General Patient Care Protocol—Adult
- Wear appropriate PPE (SCBA) as indicated
- Remove the patient from the contaminated source
- Supplemental 100% oxygen, document time oxygen started

Advanced Life Support

- Full ALS Assessment and Treatment
- For smoke inhalation patients also consider Cyanide poisoning (*See Hazardous Materials—Basic Approach Protocol*)

Contact Medical Control for any additional orders or questions

Overdose and Poisoning: Cocaine and Sympathomimetic Overdose

Advanced Life Support

- Full ALS Assessment and Treatment
- For patients with Sympathomimetic toxidrome (e.g. hypertension, tachycardia, agitation):
 - ⇒ Lorazepam (Ativan) 1-2 mg, slow IV
 - ⇒ If no IV access, Midazolam (Versed)
 - 5 mg IM/IN if < 60 years old
 - 2.5 mg IM/IN if > 60 years old
- Repeat either medication once in 5-10 minutes if signs and symptoms continue
- If seizures occur, refer to **Seizure Protocol**
- Consider **Excited Delirium**, refer to protocol

Contact Medical Control for any additional orders or questions

Pain Management—Adult

All Providers

- General Patient Care Protocol
- Assess baseline pain level (0-10 scale: 0=no pain, 10=worst pain)

Advanced Life Support

- Analgesic agents may be administered under standing orders for patients experiencing moderate/severe pain (typically $\geq 6/10$)
- Common complaints:
 - ⇒ Trauma/isolated extremity injury
 - ⇒ Burns (without airway, breathing or circulation compromise)
 - ⇒ Sickle crisis
 - ⇒ Acute Chest Pain, in accordance with the *Chest Pain* protocol
 - ⇒ Kidney stone highly suspected, in accordance with the *Abdominal Pain* protocol

Agents for pain control

- Morphine Sulfate 2-4 mg slow IVP every 2 minutes until pain relief achieved (Maximum 15 mg)

-OR-

- Fentanyl 25-50 mcg slow IVP every 2 minutes until pain relief achieved (Maximum 200 mcg)
 - ⇒ Both are contraindicated if SBP ≤ 90 mmHg
- After each drug dosage administration
 - ⇒ Reassess and document the patient's pain level (0-10 scale)
 - ⇒ Note adequacy of ventilation and perfusion
 - ⇒ Assess vital signs
- Continuously monitor oxygen saturation and end tidal CO₂
- For severe nausea or vomiting, Ondansetron (Zofran) 4 mg slow IV

Contact Medical Control for any additional orders or questions

Police Custody: Patient Care Standards

When called to a scene to assess a person in police custody, perform all assessment and treatment consistent with the standards set for the typical, non-detained patient. EMS personnel are not equipped to perform formal medical clearance for patients in police custody prior to jail transport.

- After assessing the patient and treating any obvious conditions, transport to the ED should be offered in a manner consistent with the Dane County ALS System General Guidelines.
- If the detained patient refuses transport, execute a standard refusal process as detailed in protocol.
- Advise the Law Enforcement Officer (LEO) of the patient's decision, and if all criteria are met, release the patient to the LEO.
 - ⇒ If the patient does not meet refusal criteria, advise the LEO that transport is indicated and coordinate a safe transport of the detained patient in accordance with Agency SOPs.
 - ⇒ If the LEO requires EMS transport in a scenario where the patient has refused, comply with the LEO's request and transport the patient to the nearest appropriate ED.

In scenarios where a LEO is unwilling to allow transport of a detained patient after EMS personnel have determined transport is indicated (i.e. requested transport, is not a candidate for refusal, or obvious medical necessity) adhere to the following:

- Assure that the LEO understands transport is indicated and that medical clearance prior to incarceration is not a procedure performed by EMS.
- Contact On-Line Medical Control for further input and assistance as needed.
- If these actions fail to resolve the issue, defer to the officer's legal authority to retain custody of the patient.
- Document the interaction well, including the law enforcement agency and officer involved.

Taser

For patients who have been controlled by law enforcement via a Taser device, follow this protocol in conjunction with any protocol that applies to underlying conditions (e.g. behavioral emergencies, cocaine/sympathomimetic toxicity, agitated delirium)

All Providers

- Confirm scene safety with law enforcement
- Turn patient supine if found in a prone position
- Secure the taser prongs in place if not removed by law enforcement
 - ⇒ Do not remove the prongs if lodged in the patient and left in place by law enforcement unless there is interference with important patient care measures

Advanced Life Support

- If the patient requires Chemical or Physical restraints, perform Full ALS Assessment and Treatment
- For patients with severe agitation resulting in interference with patient care or patient/crew safety, or for patients who continue to struggle against restraints refer to **Behavioral Emergencies Protocol**
- Transport patient supine or lateral recumbent position only

Patient transport in the prone position is not authorized!

Contact Medical Control for any additional orders or questions

Refusal of Medical Care

General guidelines for patient refusal of treatment and/or transport:

- A patient is any person who is requesting and/or is in need of medical attention or medical assistance of any kind.
- All patients shall be assessed and offered transport by ambulance to the nearest appropriate emergency department, regardless of the nature of the complaint.
- In the event a patient, or his/her guardian, refuses transport to the hospital, a properly executed refusal process must be completed.

Three-Step Process for EMS personnel when accepting a refusal of care:

- Step 1: Determine if the patient is legally recognized as an informed decision maker.
- Step 2: Determine if the patient's decision making capacity appears to be intact.
- Step 3: Document the interaction well.

Step 1

To undergo the informed refusal of medical care process, the patient should be one of the following:

- A person \geq 18 years of age
- A court-emancipated minor
- A legally married person of any age
- An unwed pregnant female < 18 years of age only when the medical concern relates to her pregnancy
- A parent (of any age)/ or legal guardian on behalf of their child when the refusal of care does not place the child at risk
- Involve OLMC for any refusal involving a minor when the parent/legal guardian cannot be contacted

Step 2

To undergo the informed refusal of medical care process, the patient or his/her guardian's decision-making process cannot be impaired by medical or psychiatric conditions:

- All of the following must be present:
 - ⇒ Awake, alert and oriented to person, place, time and situation (**A+OX4**)
 - ⇒ Is not experiencing a medical condition which may interfere with informed decision making capacity (e.g. hypoxia, hypoglycemia, head injury, sepsis etc.)
 - ⇒ Does not appear clinically intoxicated or under the influence of substances which may impair decision making and judgment
 - ⇒ Does not express suicidal or homicidal ideations, and does not otherwise pose an obvious threat to themselves or others
 - ⇒ Is not experiencing hallucination or other apparent thought disorder

Step 3

The following items should be documented for every refusal:

- A mental status examination as detailed in Step 2 above
- A physical examination (including vital signs)
 - ⇒ Perform blood glucose level and oxygen saturation when appropriate

Pediatric Refusals

- The following scenarios require OLMC contact prior to completing the refusal process:
 - ⇒ Refusals involving patients less than 1 year old
 - ⇒ Pediatric refusals where significant vital sign/ or physical exam abnormalities are present
- In the event a parent or guardian refuses medical care for a minor when there is reasonable concern that this decision poses a threat to the well-being of the minor:
 - ⇒ Contact the OLMC Physician for input
 - ⇒ Enlist the aid of law enforcement personnel for patient and crew safety
 - ⇒ If an immediately life threatening condition exists, transport the patient to the nearest appropriate emergency department.

Refusal of Transport After ALS Initiated:

- Contact OLMC for refusal situations that arise after advanced life support measures have been initiated
- Exceptions to this requirement are:
 - ⇒ Bronchospasm, resolved after nebulizer treatment (see protocol)
 - ⇒ Insulin-induced hypoglycemia, resolved after glucose administration (see protocol)

Contact Medical Control for any additional orders or questions

Refusal of Transport After Treatment Given

Bronchospasm Resolved After Nebulizer Treatment

After treatment of bronchospasm, and return to an asymptomatic state, some patients will refuse transport to the hospital. The following items should be accounted for and included in the assessment and documentation:

- The presentation is consistent with a mild exacerbation of asthma
- No severe dyspnea at onset
- No pain, sputum, fever or hemoptysis
- Not clinically hypoxic (oxygen saturation > 92%)
- Significant improvement after a single nebulizer treatment
- Complete resolution of symptoms
- Vital signs within normal limits after treatment (BP, pulse, respiratory rate and oxygenation)

Additional patient safety measures that should be considered:

- A family member or caregiver should be available to stay with the patient and assist if a relapse occurs
- Assure the patient understands transport has been offered and subsequently refused
- Inform the patient to follow-up with their physician as soon as possible and/or to re-contact 911 if symptoms reoccur

If the above are accounted for, a properly executed refusal of medical care can be accepted from the patient or custodian without contacting Medical Control.

Contact Medical Control for any additional orders or questions

Refusal of Transport After Treatment Given

Insulin-Induced Hypoglycemia—Resolved

This protocol applies only to insulin dependent diabetic patients refusing transport after the resolution of insulin-induced hypoglycemia by the administration of intravenous glucose. This protocol cannot be used if the patient takes any oral diabetes medications. After treatment of insulin-induced hypoglycemia and return to an asymptomatic state, some patients will refuse transport to the hospital. The following items should be accounted for and included in the assessment and documentation.

- The patient is on Insulin only (does not take **any** oral diabetes medications)
- The presentation is consistent with hypoglycemia
- Rapid improvement, and complete resolution of symptoms after glucose
- Vital signs within normal limits after glucose given (BP, pulse, respiratory rate, oxygenation and blood sugar > 70)
- There is no indication of an intentional overdose or dosing error

Additional patient safety measures that should be considered:

- A family member or caregiver should be available to stay with the patient and assist if a relapse occurs
- Assure the patient understands transport has been offered and subsequently refused
- Inform the patient to follow-up with their physician as soon as possible and/or to re-contact 911 if symptoms reoccur

If the above are accounted for, a properly executed refusal of medical care can be accepted from the patient or custodian without contacting Medical Control.

Contact Medical Control for any additional orders or questions

Sedation/Sedative Agent Use

Because sedation is a continuum, it is not always possible to predict how an individual patient receiving an agent with sedative properties will respond. This protocol is to be used in conjunction with any protocol that involves the use of medication given by any route, which may result in sedation. Examples of medications that may result in sedation are narcotics, benzodiazepines, haloperidol, Diphenhydramine, and ketamine.

Minimal Sedation (anxiolysis): A drug induced state in which patients respond normally to verbal commands. Although cognitive function and coordination may be impaired, ventilatory and cardiovascular functions are unaffected.

Moderate sedation (“conscious sedation”): A drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. Airway patency, spontaneous ventilations, gag reflex, and cardiovascular function are maintained.

Deep Sedation: A drug induced depression of consciousness, during which patients cannot be easily aroused but respond purposefully after repeated or painful stimulation. The ability to independently maintain ventilatory function may be impaired. Patients may require assistance in maintaining a patent airway and spontaneous ventilations may be inadequate.

The goal of sedative agent use is to produce the minimal degree of sedation that achieves the desired clinical effect. Sedative agent use should ideally result in minimal or moderate sedation only.

Advanced Life Support

- Full ALS Assessment and Treatment
- Continuously monitor the following:
 - ⇒ Patency of airway
 - ⇒ Vital signs
 - ⇒ Oxygen saturation and microstream capnography
 - ⇒ Cardiac rhythm
 - ⇒ Level of consciousness and ability to follow commands
- Assure that appropriate equipment and personnel are immediately available for care and resuscitation if problems arise
- Document the indications for sedation

Contact Medical Control for any additional orders or questions

Seizure

All Providers

- General Patient Care Protocol—Adult
- Supplemental 100% oxygen
 - ⇒ Nasal cannula is sufficient if no active seizures and no respiratory signs or symptoms
- Protect patient from injury

Advanced Life Support

- Full ALS Assessment and Treatment
- If Blood Glucose < 70 mg/dL, treat per **Altered Mental Status/Hypoglycemia Protocol**
- For active seizures choose one of the following options:
 - ⇒ Lorazepam (Ativan) 1-2 mg IV/IO
 - **OR** -
 - ⇒ If no IV access Midazolam (Versed)
 - 5 mg IM/IN if < 60 years old
 - 2.5 mg IM/IN if > 60 years old
 - **OR** -
 - Diazepam rectal gel (Diastat[®]) if available

12 + Years (0.2mg/kg)		
Weight		Dose
(Kg)	(Lb)	(mg)
14-27	30-60	5
28-50	61-111	10
51-75	112-166	15
76-111	167-244	20

- For seizure not controlled by the above, or if the seizure re-occurs after initial control, choose one of the following:
 - ⇒ Lorazepam (Ativan) 1-2 mg IV/IO
 - **OR** -
 - ⇒ If no IV access Midazolam (Versed)
 - 5 mg IM/IN if < 60 years old
 - 2.5 mg IM/IN if > 60 years old

Maximum dose of Lorazepam is 4 mg

Maximum dose of Midazolam is 10 mg

- If hypoxic seizures, drug induced seizures, seizures from head trauma, stroke or eclampsia suspected
 - ⇒ Treat as above and refer to appropriate protocol for further care

Contact Medical Control for any additional orders or questions
• **Additional Benzodiazepines**

Shock (Non-Trauma)

Shock is defined as a state of inadequate organ perfusion and tissue oxygenation. It is evidenced by the presence of any of the following signs and symptoms:

- Hypotension
- Narrow pulse pressure
- Tachypnea
- Tachycardia
- Delayed capillary refill
- Mottled skin appearance
- Diaphoresis
- Cool clammy skin
- Pallor
- Altered mental status

Signs and symptoms vary depending upon the stage of shock, which may be compensated (normal perfusion maintained) or decompensated (unable to maintain normal perfusion).

Categories of shock

- **Obstructive shock:** Caused by an obstruction that interferes with return of blood to the heart (e.g. tension pneumothorax, cardiac tamponade, massive pulmonary embolus)
- **Hypovolemic shock:** Caused by decreased blood or water volume. Hypovolemic shock may be hemorrhagic or non-hemorrhagic
- **Distributive shock:** Caused by abnormal distribution of blood resulting from vasodilation, vasopermeability or both. Distributive shock may result from anaphylactic reactions, sepsis, or spinal cord injury
- **Cardiogenic shock:** Caused as a result of cardiac pump failure, usually secondary to severe Left Ventricular failure. May result from massive MI

Perform the following in conjunction with protocols that apply to the specific etiology of the shock state (e.g. allergic reactions, STEMI, etc.):

Advanced Life Support

- Full ALS Assessment and Treatment
 - ⇒ Do not delay transport for IV insertion
- IV 0.9% NaCl en route (if not contraindicated):
 - ⇒ Administer 250 ml boluses until systolic BP > 90 mmHg
 - ⇒ Total amount of IVF should not exceed 2 L
 - ⇒ Boluses may be given in rapid succession if systolic remains < 90 mmHg
- If systolic BP remains < 90 mmHg after 4th bolus (1000ml):
 - ⇒ Consider Dopamine 5 mcg/kg/min, titrate infusion to maintain SBP > 90 mmHg (Maximum dose 20 mcg/kg/min)

Contact Medical Control for any additional orders or questions

Stroke—Suspected

Early recognition and transport of stroke is essential to good patient outcomes. Any patient presenting with a normal blood glucose (> 70 mg/dL), a positive Cincinnati Pre-Hospital Stroke Screen and onset of symptoms (when last seen normal) less than 24 hours should have early notification of the stroke center (**STROKE ALERT**) and rapid transport.

All Providers

- General Patient Care Protocol-Adult
- Supplemental oxygen via nasal cannula only if O₂ saturation < 95%
- Keep head of stretcher at 30-45° elevation (unless clinical condition will not allow)
- Spinal Immobilization if indicated; elevate head of backboard 15-30°
- Check Blood Glucose
- Give nothing by mouth (oral glucose is permitted if patient is able to self administer)
- Cincinnati Pre-Hospital Stroke Screen

Advanced Life Support

- Full ALS Assessment and Treatment
- Check blood glucose
- For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses or when fluid resuscitation is contraindicated
 - ⇒ Dopamine infusion 5-20 mcg/kg/min titrated to maintain systolic BP > 90 mmHg
- If hypoglycemic (<70 mg/dL) with IV access
 - ⇒ Dextrose 12.5 g IV
 - May repeat as needed every 5-10 minutes to blood glucose > 70 mg/dL
 - ⇒ Note: If patient appears malnourished or is a known or suspected chronic alcoholic administer Thiamine 100 mg IV prior to glucose administration
- If hypoglycemic (< 70 mg/dL) without IV access
 - ⇒ Glucose paste 15 g or other oral glucose agent (e.g., orange juice) if patient alert enough to self administer oral agent
 - - **OR** -
 - ⇒ Glucagon 1 mg IM

- If patient blood glucose is ≥ 70 mg/dl, Cincinnati Pre-Hospital Stroke Screen is positive and onset of symptoms (when last seen normal) is < 24 hours, immediately notify ED (**STROKE ALERT**) and commence rapid transport.
- **DO NOT DELAY TRANSPORT TO OBTAIN IV ACCESS**

Contact Medical Control for any additional orders or questions

Syncope

All Providers

- General Patient Care Protocol-Adult

Advanced Life Support

- Full ALS Assessment and Treatment
- For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses or when fluid resuscitation is contraindicated
 - ⇒ Dopamine infusion 5-20 mcg/kg/min titrated to maintain systolic BP > 90 mmHg
- If hypoglycemic (< 70mg/dL), treat per **Altered Mental Status/Hypoglycemia Protocol**
- If ECG rhythm is bradycardia, heart block or dysrhythmia see specific protocol
- If Altered Mental Status persists, or if Acute Stroke suspected, refer to appropriate protocol.

Contact Medical Control for any additional orders or questions

Trauma:

General Approach to All Trauma Patients

Assess all patients for major trauma criteria. Major trauma patients should have transport initiated within 10 minutes of arrival on scene whenever possible. In the setting of major trauma, DO NOT prolong scene time to perform procedures unless immediately necessary to stabilize patient (e.g. hemorrhage control). Initiate all other procedures en-route to the trauma center.

All Providers

- General Patient Care Protocol—Adult
- Secure airway/spinal immobilization if indicated
- Supplemental 100% oxygen if any respiratory symptoms
- Examine patient for obvious bleeding
- Control active bleeding with direct pressure
- Assess disability-neurologic status/record Glasgow coma score
- Head to toe examination to assess for injuries
- Restrain as needed

Advanced Life Support

- When conditions warrant (specified as “Full ALS Assessment and Treatment” in individual protocol)
 - ⇒ Advanced airway/ventilatory management as needed
 - ⇒ Perform cardiac monitoring
 - ⇒ Record and monitor O₂ saturation
 - ⇒ Microstream capnography if any acute respiratory symptoms
 - ⇒ IV 0.9% NaCl TKO/KVO or IV lock
 - If SBP < 90 mmHg, administer boluses of 0.9%NaCl at 250 ml until SBP > 90 mmHg
 - ⇒ Assess for Tension Pneumothorax
 - Tension pneumothorax should be suspected in patients who exhibit
 - ◇ Severe respiratory distress with hypoxia
 - ◇ Unilateral decreased or absent lung sounds (may see tracheal deviation away from collapsed lung field)
 - ◇ Evidence of hemodynamic compromise (e.g. shock, hypotension, tachycardia, altered mental status)

- Pleural decompression for tension pneumothorax should only be performed when all 3 of the above criteria are present; If indicated perform pleural decompression at the 2nd intercostal space, mid-clavicular line
- Refer to **Pain Management Protocol** as needed

Contact Medical Control for any additional orders or questions

Trauma: Burns—Thermal

All Providers

- General Patient Care Protocol—Adult
- Remove or cool heat source if present (e.g. clothing, tar)
- Keep patient warm and dry with a sheet on burns:
 - ⇒ 2° burns greater than 15% of body surface area
 - ⇒ 3° burns
 - ⇒ Electrical and chemical burns
- Spinal immobilization if high voltage electrical injuries

Advanced Life Support

- Observe for signs of impending loss of airway; Refer to the **Airway Management Protocol** as needed:
 - ⇒ Hypoxia
 - ⇒ Poor ventilatory effort
 - ⇒ Altered Mental status/decreased level of consciousness
 - ⇒ Inability to maintain patent airway
- If moderate to severe pain, see **Pain Management Protocol**
- Estimate Total Body Surface Area (TBSA) burned
 - ⇒ If > 20% 2nd and 3rd degree TBSA burned, initiate volume resuscitation with up to 2 L Normal Saline IV/IO

Contact Medical Control for any additional orders or questions

Trauma: Chest Injuries

All Providers

- General Patient Care Protocol—Adult
- Assess breath sounds frequently
- Assess for ventilatory compromise and assist with BVM as needed
- For open/sucking chest wounds, apply occlusive dressing sealed on three (3) sides or commercially available chest seal
- Remove temporarily to vent air if respiratory status worsens

Advanced Life Support

- Full ALS Assessment and Treatment
- Assess for flail segment
 - ⇒ Observe for signs of impending respiratory failure; Refer to the **Airway Management Protocol** as needed:
 - Hypoxia
 - Poor ventilatory effort
 - Altered mental status/decreased level of consciousness
 - Inability to maintain patent airway

Contact Medical Control for any additional orders or questions

Trauma: Head Injuries

All Providers

- General Patient Care Protocol-Adult
- Supplemental oxygen
- Restrain as needed
- If normotensive or hypertensive
- Elevate head off backboard 15° - 30°

Advanced Life Support

- Full ALS Assessment and Treatment
- Advanced airway/ventilatory management as needed

Note: Airway interventions can be detrimental to patients with head injury by raising intracranial pressure, worsening hypoxia (and secondary brain injury) and increasing risk of aspiration. Whenever possible these patients should be managed in the least invasive manner to maintain O₂ saturation > 90% (i.e. NRB, BVM with 100% O₂)

- Observe for signs of impending respiratory failure; Refer to the **Airway Management Protocol** if needed:
 - ⇒ Hypoxia
 - ⇒ Poor ventilatory effort
 - ⇒ Altered mental status/decreases level of consciousness
 - ⇒ Inability to maintain patent airway

For patients with assisted ventilation

- Administer eucapnic (normal rate 12-15/min) ventilations
- Titrate to target an ETCO₂ of 40 mmHg
- Acute herniation should be suspected when the following signs are present:
 - ⇒ Acute unilateral dilated and non-reactive pupil
 - ⇒ Abrupt deterioration in mental status
 - ⇒ Abrupt onset of motor posturing
 - ⇒ Abrupt increase in blood pressure
 - ⇒ Abrupt decrease in heart rate
- Hyperventilation (ventilatory rate of 20) is a temporizing measure which is only indicated in the event of acute herniation
- If signs of herniation develop, increase ventilatory rate to 20/minute and target an ETCO₂ of 30-35 mmHg

- If severely agitated/combative and unable to de-escalate by any other means, consider:
 - ⇒ Lorazepam 1-2 mg IV/IO

Contact Medical Control for any additional orders or questions

- **Additional sedation for combative patients**

Trauma: Eye Injuries

All Providers

- General Patient Care Protocol—Adult
- Measure visual acuity
- If injury is secondary to a chemical exposure:
 - ⇒ Remove patient from source if safe to do so
 - ⇒ Remove contact lenses if appropriate; transport with patient
 - ⇒ Irrigate the eyes with 0.9 % Normal Saline for a minimum of 20 minutes
 - ⇒ For significant pain, administer 2 drops of Tetracaine HCL to affected eye(s)
 - ⇒ Determine chemical involved, bring MSDS sheet if available
- If eye injury is due to trauma:
 - ⇒ Do not irrigate or apply Tetracaine HCL
 - ⇒ Stabilize any penetrating objects
 - ⇒ Do not remove any impaled object
 - ⇒ Protective metal shield unless impaled object precludes
 - ⇒ Prevent patient bending or standing
 - ⇒ If blood observed in anterior chamber, transport with head elevated 60°

Contact Medical Control for any additional orders or questions

Trauma: Extremity

All Providers

- General Patient Care Protocol—Adult
- Remove or cut away clothing to expose area of injury
- Control active bleeding
- Check distal pulses, capillary refill, sensation/movement prior to splinting
 - ⇒ If pulse present, splint in position found if possible
 - ⇒ If pulse absent, attempt to place the injury into anatomical position
- Open wounds/fractures should be covered with sterile dressings and immobilized in the presenting position
- Dislocations should be immobilized to prevent any further movement of the joint
- Check distal pulses, capillary refill and sensation after splinting

Advanced Life Support

- Full ALS Assessment and Treatment
- For isolated extremity trauma:
 - ⇒ Stabilize BP (SBP \geq 90 mmHg)
 - ⇒ Refer to the **Pain Management** protocol as needed
- For uncontrollable hemorrhage (heavy bleeding despite aggressive direct pressure):
 - ⇒ Apply tourniquet device as proximal on extremity as possible
 - ⇒ Tourniquet must be at least 2 inches wide
 - ⇒ Tighten tourniquet until bright red bleeding has stopped
 - ⇒ Secure in place and expedite transport to Level 1 Trauma Center
 - ⇒ Document time placed on chart and on device (if possible)
 - ⇒ Notify receiving center of presence, time placed, and location of tourniquet

Contact Medical Control for any additional orders or questions

Trauma: Traumatic Amputations

All Providers

- General Patient Care Protocol—Adult
- If amputation incomplete:
 - ⇒ Attempt to stabilize with bulky pressure dressing
 - ⇒ Splint inline
- If amputation complete:
 - ⇒ Cleanse amputated part with sterile saline
 - ⇒ Wrap in sterile dressing moistened in sterile saline
 - ⇒ Place in plastic bag if possible
 - ⇒ Attempt to cool with cool pack during transport

Advanced Life Support

- For isolated extremity trauma:
 - ⇒ Stabilize BP (SBP \geq 90 mmHg)
 - ⇒ Refer to **Pain Management** protocol as needed
- For uncontrollable hemorrhage (heavy bleeding despite aggressive direct pressure):
 - ⇒ Apply tourniquet device as proximal to injury site on extremity as possible
 - ⇒ Tourniquet must be at least 2 inches wide
 - ⇒ Tighten tourniquet until bright red bleeding has stopped
 - ⇒ Secure in place and expedite transport to Level 1 Trauma Center
 - ⇒ Document time placed on chart and on device (if possible)
 - ⇒ Notify receiving center of presence, time placed and location of tourniquet

Contact Medical Control for any additional orders or questions

Trauma: Indications for Withholding Resuscitation in Traumatic Cardiopulmonary Arrest

CPR can be withheld in Traumatic Cardiopulmonary Arrest under the following circumstances:

- Pulseless, apenic, and no other signs of life present AND
 - The presence of one or more of the following:
 - ⇒ Rigor Mortis
 - ⇒ Decomposition of body tissues
 - ⇒ Dependant Lividity
 - ⇒ Injuries incompatible with life (e.g. incineration, decapitation, hemicorporectomy)
 - ⇒ Evidence of significant time lapse since pulselessness
- OR -**
- Patients who present pulseless after blunt trauma or penetrating trauma provided that all other signs of life are absent:
 - ⇒ Pulseless and Apenic
 - ⇒ Lack of pupillary reflexes and spontaneous movement
 - ⇒ Asystole or agonal rhythm < 20 on cardiac monitor
- OR -**
- Patients who become pulseless after severe traumatic injury when transport to the **NEAREST ED** cannot be accomplished within 15 minutes (i.e., prolonged extrications), provided that all other signs of life are absent and transport has not been initiated:
 - ⇒ Pulseless and apenic
 - ⇒ Lack of pupillary reflexes and spontaneous movement
 - ⇒ Asystole or agonal rhythm < 20 on cardiac monitor

This criteria does not apply in the following scenarios:

- When the Cardiac Arrest is inconsistent with Cardiac Arrest due to trauma
- Lightning or other high voltage injuries
- Drowning
- Suspected hypothermia
- Transport has been initiated

Contact Medical Control for any additional orders or questions

Trauma: Sexual Assault

- General Patient Care Protocol
- For victims of sexual assault who meet major trauma criteria, transport to Level 1 Trauma Center
- For all other cases, transport to nearest appropriate Emergency Department
- Provide supportive care as indicated by patient's condition
- Preserve evidence

Contact Medical Control for any additional orders or questions

Spinal Immobilization: Indications

Determining the need for spinal immobilization requires a careful assessment of the injury, the patient's complaints and overall condition, and the patient's ability to recognize and convey the presence of spinal injury symptoms. It is not feasible to "clear" the spine in the prehospital setting. Spinal immobilization should always be applied when any doubt exists as to the possibility of spinal trauma. The following algorithms (Blunt and Penetrating Trauma) can be used to assist paramedics in making the most appropriate decision about the need for spinal immobilization.

Blunt Trauma

Assess for concerning mechanism of injury:

- Any mechanism that produces a violent impact on the head, neck, torso or pelvis
- Incidents that produce sudden acceleration or deceleration, including lateral bending forces
- Any fall, especially in the elderly
- Ejection or fall from a moving mode of transportation
- Shallow-water drowning or diving injuries
- High-voltage electrical injuries

Assess patient's ability to clearly communicate and/or comprehend the nature of their injuries:

- Altered level of consciousness
 - ⇒ GCS < 15
 - ⇒ Evidence of significant intoxication
 - ⇒ Dementia
- Speech or hearing impairment
- Age (young children)
- Language barrier

Assess for physical signs or symptoms of spinal trauma:

- Spinal pain or tenderness, including paraspinal muscles
- Neurologic deficit or complaint, including paresthesia, paralysis, or weakness
- Anatomical deformity of the spine

Assess for presence of distracting injuries, e.g.:

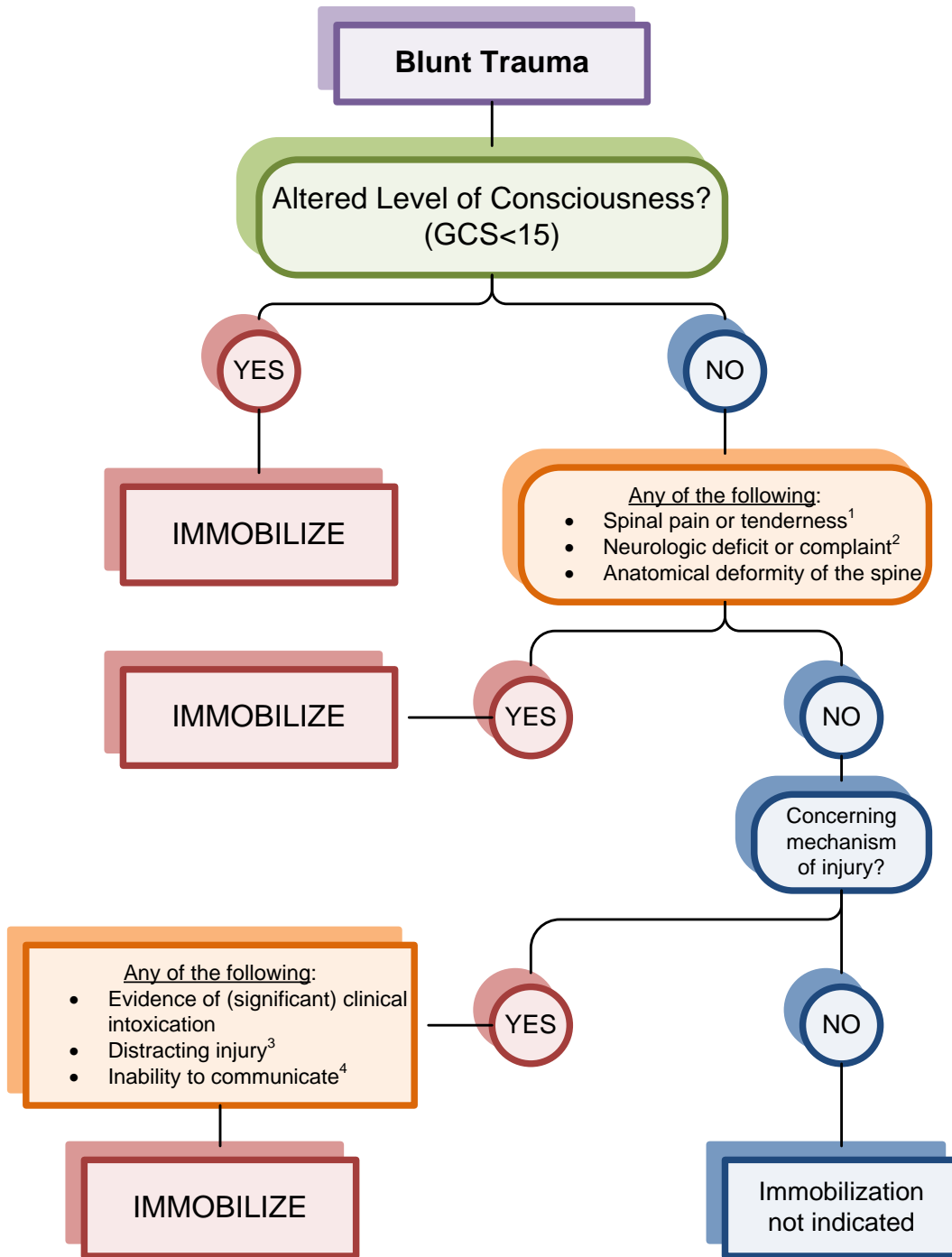
- Long bone fractures
- Joint dislocations

- Abdominal or thoracic pain, or obvious visceral injury
- Large lacerations, degloving injuries or crush injuries
- Any injury producing acute functional impairment
- Craniofacial injuries

**IF ANY OF THE ABOVE MENTIONED FEATURES ARE PRESENT,
OR IF ANY QUESTION, IMMOBILIZE!**

Contact Medical Control for any additional orders or questions

Spinal Immobilization: Indications



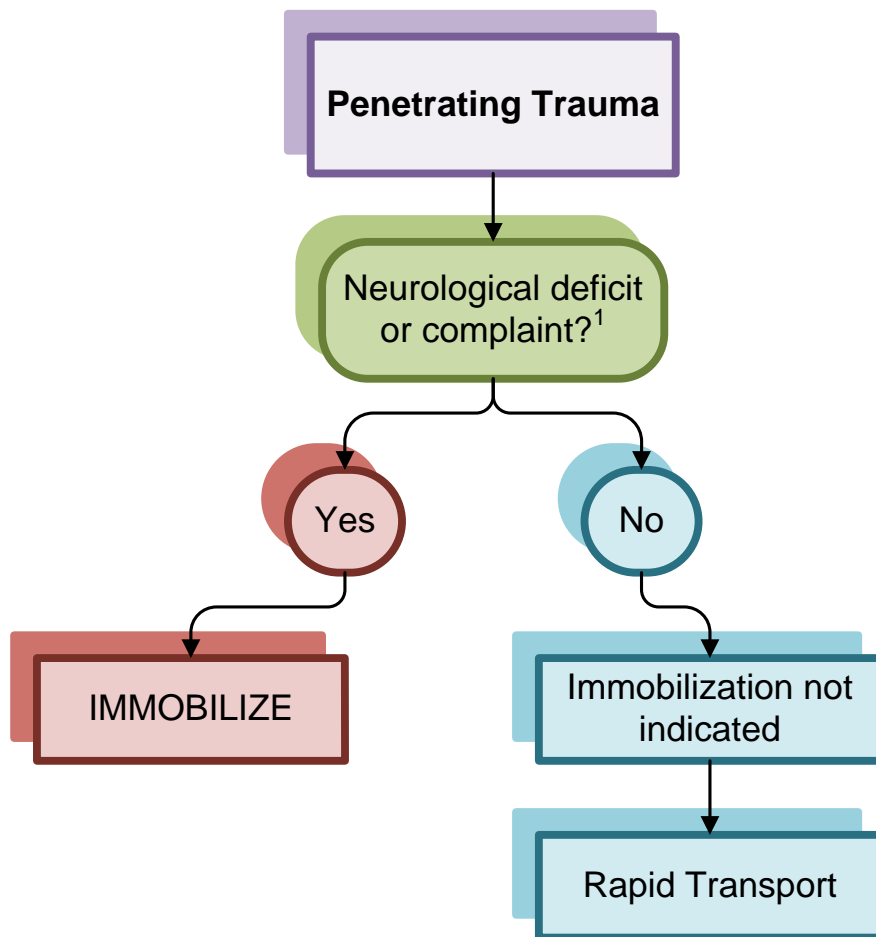
¹Tenderness to the midline posterior neck and back, including the paraspinal musculature
²Examples are numbness, focal weakness, focal sensory deficit, parasthesias
³Examples are long bone fractures, dislocations, large lacerations, degloving injuries, serious burns or any other injury causing functional impairment
⁴Examples include language barrier, hearing or speech impairment, and age (young children)

Spinal Immobilization: Indications

Penetrating Trauma

Assess for the presence of neurological deficits or complaints:

- Test motor function in both upper and lower extremities (entire extremity)
- Test sensation in both upper and lower extremities (start proximal and work towards hands and feet)
- Ask about numbness and tingling in extremities



¹Examples are numbness, focal weakness, focal sensory deficit, and parasthesias. Determining the presence of neurological signs and symptoms requires careful assessment and history taking.

IF IN DOUBT IMMOBILIZE!

Immobilize all patients with the following conditions:

- High voltage electrical injuries (does not include Taser use)
- Shallow water drowning or diving injuries

If spinal immobilization is indicated but refused by the patient:

- Advise the patient of the indication for immobilization, and the risks of refusing the intervention.
- If the patient allows, apply the cervical collar even if backboard is refused.
- Maintain spinal alignment as best as can be achieved during transport.
- Clearly document refusal of immobilization.

For patients who cannot tolerate supine position due to clinical condition:

- Apply all elements of spinal immobilization that the patient will tolerate.
- Maintain spinal alignment as best as can be achieved during transport.
- Clearly document the clinical condition that interfered with full immobilization.

Contact Medical Control for any additional orders or questions

General Approach to All Pediatric Patients

The following measures will apply to the management of all pediatric patients:

A Child shall be defined as:

- Age \leq 12 years of age or weight \leq 40 kg (if age unknown)
- No signs of puberty if age/weight not able to be determined
- For PALS resuscitation \leq 8 years
- For Major Trauma $<$ 18 years

All Providers

- Ensure scene safety.
- Scene survey to determine environmental conditions, mechanism of injury or illness and potential for hazardous conditions.
- Form general impression of patient's condition.
- Establish patient responsiveness.
- Immobilize spine if cervical or other spine injury suspected.
- Assess airway and breathing.
- Supplemental 100% oxygen if any respiratory signs or symptoms
- Assess circulation and perfusion by measuring heart rate, and observing skin color, temperature, capillary refill and the quality of central/peripheral pulses
 - ⇒ For children with absent pulses, initiate cardiopulmonary resuscitation
- Control hemorrhage using direct pressure or a pressure dressing
- Measure BP in children older than 3
- Evaluate mental status including pupil reaction, motor function and sensation
 - ⇒ For mental status, use the AVPU scale:
 - A-The patient is alert and orientated (age appropriate)
 - V-The patient is responsive to verbal stimulus
 - P-The patient is responsive to painful stimulus
 - U-The patient is unresponsive to any stimulus
- Expose the child only as necessary to perform further assessments
- Maintain the child's body temperature throughout the assessment
- Utilize the Broslow-Luten[®] system for estimating patient weight

Advanced Life Support

- When condition warrants (specified as “Full Pediatric ALS Assessment and Treatment” in individual protocols):
 - ⇒ Advanced airway/ventilatory management as needed
 - ⇒ Perform cardiac monitoring
 - ⇒ Record and monitor O2 saturation
 - ⇒ Record and monitor End-tidal CO2
 - ⇒ If symptoms severe or for medication access IV 0.9% NaCl TKO/KVO or IV Lock
 - If signs of shock administer boluses of 0.9% NaCl at 20 ml/kg until signs of shock resolve or 60 ml/kg total
- If signs of severe cardiopulmonary compromise (poor systemic perfusion, hypotension, altered consciousness and/or respiratory distress/failure) and IV attempts unsuccessful in a child consider intraosseous access
 - ⇒ If a child’s condition is critical or unstable, initiate transport without delay
 - Perform procedures, history and detailed physical exam **en route** to the hospital
- All medication dosages and equipment sizes should be calculated using the Broselow-Luten[®] system
 - ⇒ Reassess the patient frequently

Contact Medical Control for any additional orders or questions

Airway Emergencies: Pediatric Dyspnea

All Providers

- General Patient Care Protocol—Pediatric
- Supplemental 100% oxygen
- For Bronchospasm:
 - ⇒ Albuterol (Proventil) 2.5 mg/3 ml via nebulizer and Ipratropium Bromide 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer
- If severe:
 - ⇒ Hypoxia: < 92%, severe respiratory distress, anaphylactic shock, stridor
 - ⇒ Assist with patient-prescribed Epinephrine auto-injector (e.g. Epi-Pen or Epi-Pen Jr.)
- If foreign body obstruction is suspected refer to foreign body protocol

Advanced Life Support

- Full Pediatric ALS Assessment and Treatment
- For Bronchospasm:
 - ⇒ Albuterol (Proventil) 2.5mg/3ml via nebulizer every 15 minutes (max 3 treatments)
- If patient shows signs of worsening respiratory distress, inadequate ventilations or respiratory failure in the setting of bronchospasm or a history of asthma
 - ⇒ Epinephrine 1:1000 at 0.01 mg/kg (max 0.3 mg) IM
 - May repeat epinephrine every 15 minutes X 2 additional doses (3 total) if severe symptoms present
 - May administer at same time nebulizer is being administered
 - ⇒ Methylprednisolone (Solu-Medrol) 2 mg/kg IV or IM (Maximum individual dose 125 mg)
 - ⇒ Magnesium Sulfate 50mg/kg IV (max individual dose 2g) in 100 ml D5W over 5-10 minutes; contraindicated if history of renal failure
- If partial upper airway obstruction or stridor without severe respiratory distress
 - ⇒ Do nothing to upset the child
 - ⇒ Perform critical assessments only
 - ⇒ Have parent administer blow by supplemental oxygen
 - ⇒ Place patient in position of comfort
 - ⇒ Do not attempt vascular access
 - ⇒ Expedite transport

- If complete airway obstruction or severe respiratory distress, failure or arrest
⇒ Advanced airway/ventilatory management as needed

Drowning/Near Drowning

- Advanced ventilatory management/100% O2 as indicated
- Spinal Immobilization if indicated
- Protect from heat loss
- Patients may develop delayed onset respiratory symptoms
- Refer to appropriate protocol if cardiac arrest present

Contact Medical Control for any additional orders or questions
• **Racemic Epinephrine**

Airway Emergencies: Pediatric Airway Management

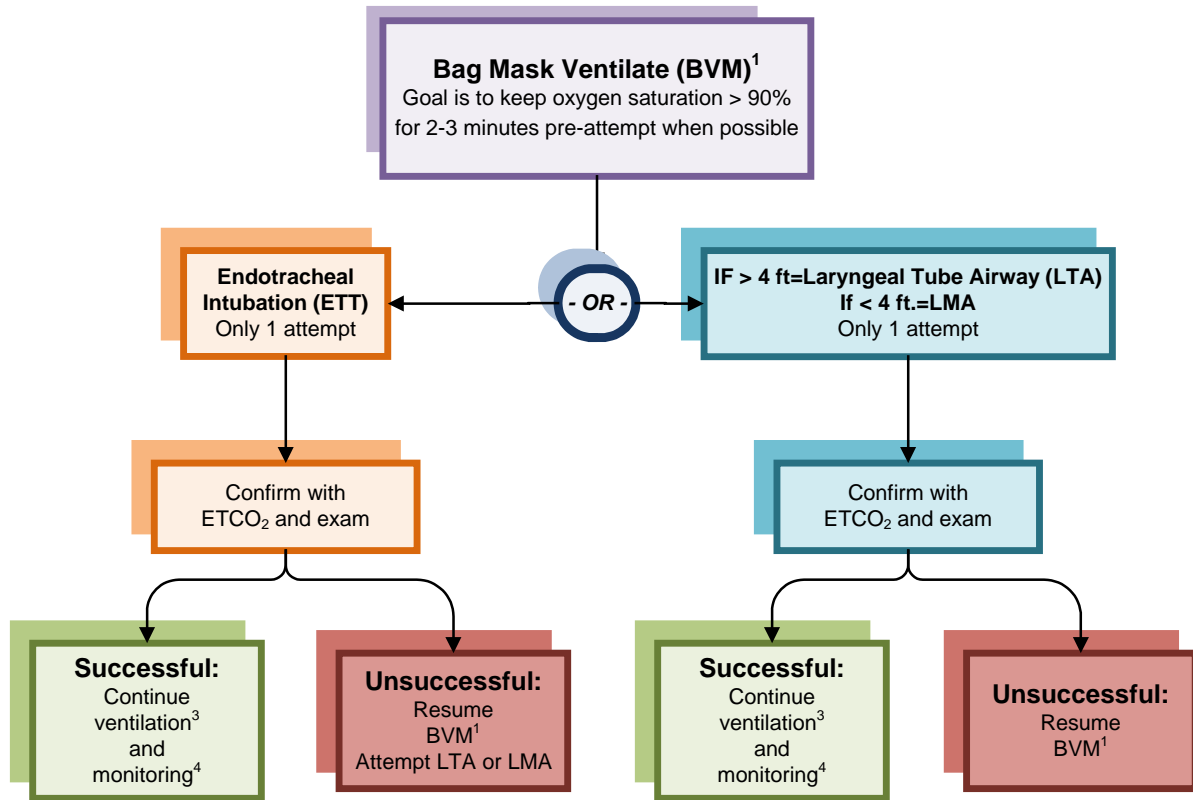
All Providers

- General Pediatric Patient Care Protocol
- If suspicion of trauma, maintain c-spine immobilization
- Suction all debris, secretions from airway
- Bag valve mask ventilate
- Ventilate at a rate of 20 breaths/minute for all ages
- Supplemental 100% O₂

Advanced Life Support

- Have assistant apply cardiac monitor as soon as possible
 - ⇒ Address cardiac rhythm abnormalities per appropriate protocol
- Monitor end-tidal CO₂ and oxygen saturation continuously
- BVM ventilate at least 2 minutes with 100% O₂ to achieve oxygen saturation >90%
- Follow sequence listed below (use Broselow-Luten[®] tape to select appropriate equipment)

Airway Emergencies: Pediatric Emergency Airway Management



¹At every step of airway algorithm, effective bag-valve-mask ventilation is an acceptable level of airway management.

²Place oral-gastric tube via insertion port on LTA; attach to low continuous suction.

³Components of effective ventilation include oxygenation, chest rise and fall, adequate lung sounds, and the presence of alveolar waveform on capnography.

⁴Monitor ETCO₂, oxygen saturation and assess for effective ventilation continuously.

- Following placement of ETT, LTA, or LMA confirm proper placement
 - ⇒ Assess epigastric sounds, breath sounds and chest rise and fall
 - ⇒ Observe for presence of alveolar waveform on capnography
 - ⇒ Record tube depth and secure in place using a commercial tube holder (if available)
 - ⇒ Utilize head restraint device (i.e. “head blocks”) or rigid cervical collar and long spine board as needed to help secure airway in place

Capnography/ETCO₂ Monitoring

- Digital capnography (waveform) is the system **STANDARD** for ETCO₂ monitoring
- With the exception of on-scene equipment failure, patients should not be switched from digital capnography (Zoll/Phillips/Lifepack) to a colorimetric device for monitoring end-tidal CO₂
- In the event digital capnography is not possible due to on-scene equipment failure, continuous colorimetric monitoring of ETCO₂ is an acceptable alternative

Continuous ETCO₂ monitoring is a mandatory component of invasive airway management

- ⇒ If ETCO₂ monitoring cannot be accomplished by either of the above methods, the invasive device must be removed, and the airway managed non-invasively
- ⇒ If an alveolar waveform is not present with capnography (i.e., flat line), remove the device, and proceed to the next step in the algorithm

Foreign Body Airway Obstruction

- If unresponsive open airway using a head tilt/chin lift (if no trauma)
 - ⇒ If < 1 year old, administer up to 5 back blows and 5 chest thrusts
 - ⇒ If ≥ 1 to 8 years, administer compressions and attempts at ventilation until the foreign body is dislodged
- If ventilation is unsuccessful (O₂ saturations cannot be kept > 92 %) perform in the following order:
 - ⇒ Reposition airway and attempt bag valve mask assisted ventilation again
 - ⇒ If unsuccessful, establish direct view of object with laryngoscope and attempt to remove it with Magill forceps
 - ⇒ If unable to visualize a foreign body using laryngoscope, and vocal cords are clearly seen, attempt intubation only once
 - ⇒ If unsuccessful, re-attempt BVM ventilation; If oxygen saturation > 90 with BVM proceed no further and expedite transport
- Expedite transport to nearest emergency department

Contact Medical Control for any additional orders or questions

Allergic Reactions: Pediatric

All Providers

- General Patient Care Protocol-Pediatrics
- Assist patient in self-administration of previously prescribed epinephrine auto-injector (Epi-Pen, Epi-Pen Jr)
 - ⇒ Albuterol (Proventil) 2.5 mg/3 ml via nebulizer and Ipratropium Bromide 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer
- Nothing by mouth

Advanced Life Support

- If moderate or severe symptoms, perform Full Pediatric ALS Assessment and Treatment
- Mild Reaction (hives)
 - ⇒ Diphenhydramine (Benadryl) 1 mg/kg IV (maximum 50 mg)
 - May be administered IM if no IV access available
- Moderate Reaction (Dyspnea, Wheezing, Chest Tightness)
 - ⇒ As above plus:
 - Albuterol (Proventil) 2.5 mg/3 ml via nebulizer and Ipratropium Bromide 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer
 - ◇ May repeat Albuterol in 15 minutes for continued wheezing
- Severe Systemic Reaction (Anaphylactic shock, Stridor, Severe respiratory distress)
 - ⇒ As above plus:
 - Epinephrine 1:1000 solution, 0.01 mg/kg IM (Max dose 0.3 mg)
 - ◇ Massage injection site vigorously for 30-60 seconds
 - ⇒ Methylprednisolone (Solumedrol) 2 mg/kg IV or IM (Maximum individual dose 125 mg)

Contact Medical Control for any additional orders or questions

- **Repeat epinephrine if signs of severe reaction or shock persist after initial dose**
- **For severe reactions, Famotidine 0.5mg/kg in 100 ml D5W IV Piggyback (max dose 20mg) over 15 minutes.**

Altered Mental Status: Pediatric

This protocol is intended for pediatric patients with new altered mental status of unknown etiology.

All Providers

- General Pediatric Patient Care Protocol
- If trauma suspected, stabilize spine
- Supplemental 100% oxygen
- Blood glucose check

Advanced Life Support

- Full Pediatric ALS Assessment and Treatment
- Determine blood glucose and treat:
 - ⇒ Neonates (≤ 2 months) < 40 mg/dL
 - D12.5W at 4 ml/kg
 - ⇒ Child (2 months-12 years) < 70 mg/dL
 - D25W at 2 ml/kg

To make D12.5: draw up 1 ml of D50 and dilute with 3 ml of 0.9% NaCl

To make D25: draw up 1 ml of D50 and dilute with 1 ml of 0.9% NaCl

- OR -

- Glucagon 0.1 mg/kg IM (Maximum dose 1 mg) if IV or IO access unavailable
- Repeat Dextrose X1 if blood glucose remains < 70 mg/dL (< 40 in a neonate) after treatment or unable to determine blood glucose and no change in mental status.
- If patient has continued altered mental status:
 - ⇒ Naloxone at 0.1 mg/kg (maximum individual dose 2 mg) via IV/IO
 - If no IV access, administer IN via mucosal atomizer device (MAD), with one-half of dose administered to each nostril.

Contact Medical Control for any additional orders or questions

Apparent Life-Threatening Event (ALTE)

An Apparent Life Threatening Event (ALTE), often referred to as a “near miss SIDS”, is an episode that is frightening to the observer/caregiver, and involves some combination of the following:

- Apnea (central or obstructive)
- Color change (cyanosis, pallor, erythema, plethora)
- Marked change in muscle tone (e.g. limpness/rigid)
- Choking or gagging

All Providers

- Assume the history given is accurate and reliable
- Determine the severity, nature and duration of the episode
- Obtain a medical history:
 - ⇒ Known chronic diseases
 - ⇒ History of preterm delivery
 - ⇒ Evidence of seizure activity
 - ⇒ Current or recent infections
 - ⇒ Gastroesophageal reflux
 - ⇒ Inappropriate mixture of formula
 - ⇒ Recent trauma
- Perform a thorough physical assessment that includes the general appearance, skin color, level of interaction with environment and evidence of trauma and blood glucose check
- Transport to the nearest appropriate receiving facility

For patients < 1 year of age

- If the parent/guardian is refusing medical care and/or EMS transport, **OLMC must be contacted prior to accepting a refusal.**

Contact Medical Control for any additional orders, questions, or refusal in a patient <1 year of age

Cardiac Arrest, General: Pediatric

Airway management by BVM is sufficient in the pediatric arrest patient. A single attempt at intubation can be made only if time allows. Do not prolong transport or scene time to attempt intubation.

All Providers

- General Pediatric Patient Care Protocol
- Establish responsiveness
- If trauma suspected, stabilize spine
- Confirm apnea and pulselessness and administer CPR
- Apply AED as soon as available for ≥ 8 years old
 - ⇒ For children 1-8 years old use pediatric AED cables/electrodes if available
 - ⇒ As a last resort in a child 1-8 years old, apply AED with available cables/electrodes
- Do not apply AED to children < 1 year old

Advanced Life Support

- Full Pediatric ALS Assessment and Treatment
- Determine cardiac rhythm and refer to appropriate protocol for further management actions
- Determine blood glucose and treat:
 - ⇒ Neonates (≤ 2 months) < 40 mg/dL
 - D12.5W at 4 ml/kg
 - ⇒ Child (2 months-12 years) < 70 mg/dL
 - D25W at 2 ml/kg

To make D12.5: draw up 1 ml of D50 and dilute with 3 ml of 0.9% NaCl

To make D25: draw up 1 ml of D50 and dilute with 1 ml of 0.9% NaCl

- OR -

- Glucagon 0.1 mg/kg IM (Maximum dose 1 mg) if IV or IO access unavailable
- Repeat Dextrose X1 if blood glucose remains < 70 mg/dL (< 40 in a neonate) after treatment or unable to determine blood glucose and no change in mental status.
- Due to the child's critical condition, initiate transport without delay.

Contact Medical Control for any additional orders or questions

Cardiac Asystole and PEA: Pediatric

Asystole and Pulseless Electrical Activity

Advanced Life Support

- Follow **Cardiac Arrest/Non-Traumatic—Pediatric Protocol**
- Confirm the presence of asystole in 2 leads
- Minimize any interruptions in compressions
- Using the most readily available route, administer (during CPR)
 - ⇒ Epinephrine 1:10,000 at 0.01 mg/kg IV/IO (max dose 1mg)
 - ⇒ Repeat Epinephrine as above every 3-5 minutes
 - ⇒ Flush medication with 10-20 ml of normal saline after each dose
- Treat any suspected contributing factors:
 - ⇒ If hypovolemic, administer 0.9% NaCl at 20 ml/kg IV/IO bolus, may repeat twice (to a maximum of 60 ml/kg)
 - ⇒ If hypoxic, secure airway and assist ventilation
 - ⇒ If hypothermic, rewarm
 - ⇒ If hyperkalemia suspected (history of renal failure/dialysis)
 - Calcium Chloride (10%), 20 mg/kg IV/IO (max 1 g)
 - Sodium Bicarbonate 1 mEq/kg IV/IO (max dose 50 mEq)
 - ⇒ If narcotic suspected, Naloxone 0.1 mg/kg (max dose 2 mg) IM/IV/IO/IN
 - ⇒ If toxic ingestion, see specific toxin
 - ⇒ Assess for tension pneumothorax
 - Unilateral decreased or absent lung sounds (may see tracheal deviation away from collapsed lung)
 - Evidence of hemodynamic compromise
 - If tension pneumothorax suspected due to history or condition, perform pleural decompression at 2nd intercostal space, mid-clavicular line

Contact Medical Control for any additional orders or questions

Cardiac Arrest: VF/VT: Pediatric

Ventricular Fibrillation or Pulseless Ventricular Tachycardia

Advanced Life Support

- Follow **Cardiac Arrest/Non-traumatic-Pediatric Protocol**
- Confirm the presence of ventricular fibrillation/pulseless ventricular tachycardia
- Defibrillate at 2 J/kg (maximum of 200J)
 - ⇒ Continue compressions while defibrillator charges
 - ⇒ Immediately resume CPR after shock
 - ⇒ Check rhythm after 2 minutes of CPR
- Using the most readily available route (give drug during CPR)
 - ⇒ Epinephrine 1:10,000 at 0.01 mg/kg IV/IO
 - ⇒ Repeat Epinephrine as above every 3-5 minutes
 - ⇒ Flush medication with 10-20 ml of normal saline after each dose
- If shockable rhythm persists, Defibrillate at 4 J/kg
 - ⇒ Continue compressions while defibrillator charges
 - ⇒ Immediately resume CPR after shock
 - ⇒ Check rhythm after 2 minutes of CPR
 - ⇒ Amiodarone 5 mg/kg IV/IO bolus (give during CPR) (max dose 300mg)
 - ⇒ Magnesium 50 mg/kg IV/IO for suspected torsades de pointes (max dose 2g)
- If shockable rhythm persists, Defibrillate at 4 J/kg
 - ⇒ Continue compressions while defibrillator charges
 - ⇒ Immediately resume CPR after shock
 - ⇒ Check rhythm after 2 minutes of CPR
- Continue cycle

Contact Medical Control for any additional orders or questions

Cardiac Arrhythmia: Pediatric Bradycardia

All Providers

- General Pediatric Patient Care Protocol
- Supplemental 100% oxygen
- Assist ventilation as needed with bag valve mask
- Look for signs of obstruction
 - ⇒ Absent breath sounds, tachypnea, intercostal retractions, stridor or drooling, choking, bradycardia or cyanosis
 - ⇒ If foreign body obstruction is suspected refer to foreign body protocol
 - ⇒ Open airway using head tilt/chin lift if no spinal trauma is suspected and modified jaw thrust if spinal trauma suspected

Advanced Life Support

- Full Pediatric ALS Assessment and Treatment
- If signs of severe cardiopulmonary compromise are present in an infant (< 1 year) and the heart rate remains slower than 60 beats per minute despite oxygenation and ventilation:
 - ⇒ Initiate chest compressions
- Determine blood glucose and treat:
 - ⇒ Neonates (≤ 2 months) < 40 mg/dL
 - D12.5W at 4 ml/kg
 - ⇒ Child (2 months-12 years) <70 mg/dL
 - D25W at 2 ml/kg

To make D12.5: draw up 1 ml of D50 and dilute with 3 ml of 0.9% NaCl

To make D25: draw up 1 ml of D50 and dilute with 1 ml of 0.9% NaCl

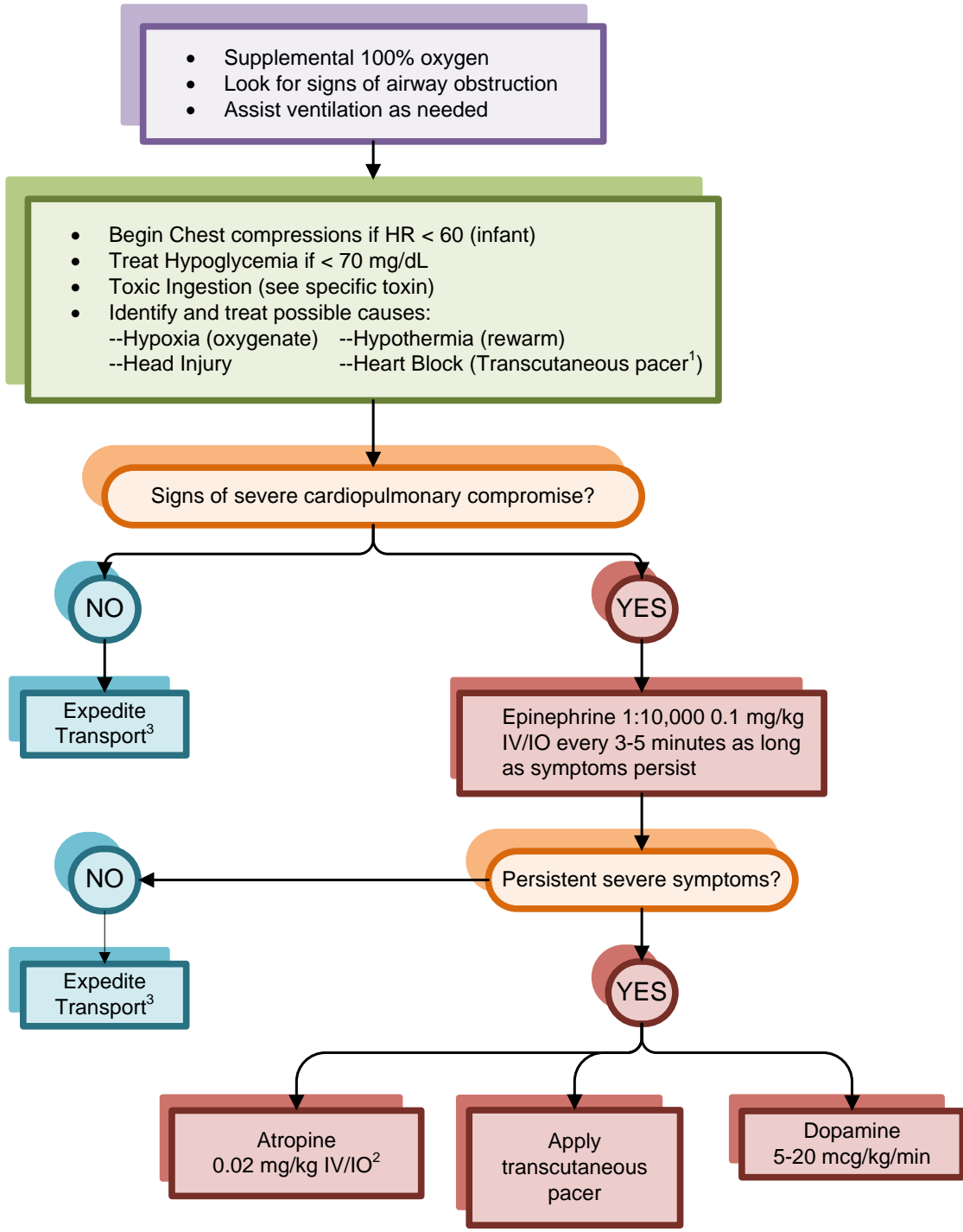
- OR -

- Glucagon 0.1 mg/kg IM (Maximum dose 1 mg) if IV or IO access unavailable
- Repeat Dextrose X1 if blood glucose remains < 70 mg/dL (<40 in a neonate) after treatment or unable to determine blood glucose and no change in mental status
- If signs of severe cardiopulmonary compromise persist (use first available route)
 - ⇒ Epinephrine 0.01 mg/kg of a 1:10,000 solution IV/IO (max 1 mg)
- Repeat dose every 3-5 minutes until either the bradycardia or severe cardiopulmonary compromise resolves.

- Identify and treat possible causes of bradycardia:
 - ⇒ If hypoxia, open airway/assist breathing
 - ⇒ If hypothermic, rewarm
 - ⇒ If acutely deteriorating head injury, hyperventilate
 - ⇒ If heart block or post heart transplant, apply transcutaneous pacer (see below)
 - ⇒ If toxin ingestion, see specific toxin
- If signs of severe cardiopulmonary compromise persist despite Epinephrine and above measures
 - ⇒ Atropine at 0.02 mg/kg IV/IO
 - Minimum dose is 0.1 mg
 - Maximum individual dose is 0.5 mg
 - May repeat once after 3-5 minutes
- If signs of severe cardiopulmonary compromise persist despite Epinephrine/Atropine apply transcutaneous pacemaker
 - ⇒ If weight \geq 15 kg, apply adult transcutaneous pacemaker
 - ⇒ If $<$ 15 kg use pediatric pads (small/medium electrodes) in the standard configuration for adult size pacer pads
 - Use the lowest setting that provides ventricular capture (pulse)
 - Set rate to 100 beats per minute
- If severe cardiopulmonary compromise persists despite pacing:
 - ⇒ Dopamine infusion at 5-20 mcg/kg/min IV/IO

Contact Medical Control for any additional orders or questions

Cardiac Arrhythmia: Pediatric Bradycardia



¹Use lowest milliamp setting that achieves electrical and mechanical (pulse) capture.
²Minimum dose 0.1 mg; maximum dose 0.5 mg
³Whenever possible, avoid on-scene delays to perform procedures.

Cardiac Arrhythmia: Pediatric Tachycardia

Note: Infants with heart rates < 220 and children with heart rates < 180 typically will respond when the precipitating cause is treated (e.g. fever, dehydration)

All Providers

- General Pediatric Patient Care Protocol
- If trauma suspected, stabilize spine
- Supplemental 100% oxygen

Advanced Life Support

- Full Pediatric ALS Assessment and Treatment
- Determine blood glucose and treat:
 - ⇒ Neonates (≤ 2 months) < 40 mg/dL
 - D12.5W at 4 ml/kg
 - ⇒ Child (2 months-12 years) <70 mg/dL
 - D25W at 2 ml/kg

To make D12.5: draw up 1 ml of D50 and dilute with 3 ml of 0.9% NaCl

To make D25: draw up 1 ml of D50 and dilute with 1 ml of 0.9% NaCl

- OR -

- Glucagon 0.1 mg/kg IM (Maximum dose 1 mg) if IV or IO access unavailable
- Repeat Dextrose X1 if blood glucose remains < 70 mg/dL (< 40 in a neonate) after treatment or unable to determine blood glucose and no change in mental status

Sinus Tachycardia

- Identify and treat possible causes

Supraventricular tachycardia with severe cardiopulmonary compromise

- If time and patient condition permits, attempt vagal maneuvers
- If vascular access is available, Adenosine (Adenocard) 0.1 mg/kg (Maximum individual dose is 6 mg) via rapid IV/IO bolus (IV access in the antecubital space is preferred)
 - ⇒ Repeat Adenosine (Adenocard) twice at 0.2 mg/kg if needed (maximum individual dose is 12mg)

- If Adenosine is unsuccessful and patient still has severe cardiopulmonary compromise:
 - ⇒ Synchronized Cardioversion at 0.5-1 J/kg
 - Consider sedation if time permits
 - ◇ Midazolam 0.1 mg/kg IV/IO (max dose 2 mg)
 - ⇒ May repeat synchronized cardioversion at double the initial energy (maximal individual dose 360 J)

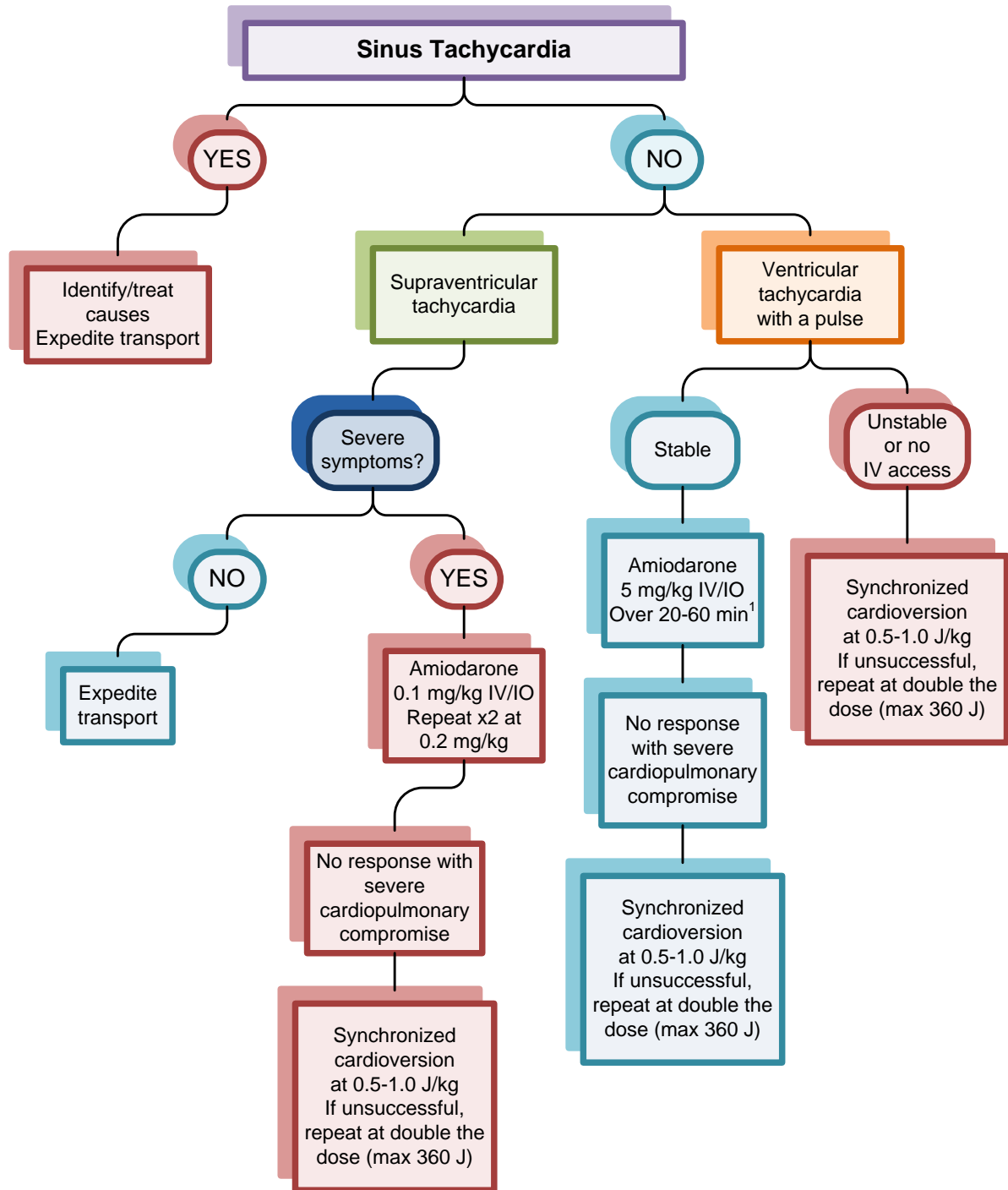
Ventricular Tachycardia with a pulse

- If vascular access is readily available OR the patient is stable:
 - ⇒ Amiodarone 5 mg/kg/IV over 20-60 minutes, (Max individual dose is 150 mg)
- If vascular access is not readily available AND the patient is unstable:
 - ⇒ Synchronized Cardioversion at 0.5-1.0 J/kg
 - ⇒ Consider sedation if time permits:
 - Midazolam 0.1 mg/kg IV/IO (max dose 2 mg)
 - ⇒ May repeat at double the initial energy (maximal individual dose 360 J)
- If Torsade de Pointes is suspected:
 - ⇒ Magnesium Sulfate 50mg/kg in 100 ml D5W IV/IO over 10 minutes (max dose 2 g)

Contact Medical Control for any additional orders or questions

- **Failed response to 2 attempts at cardioversion**

Cardiac Arrhythmia: Pediatric Tachycardia



¹If Torsades de Pointes suspected, give Magnesium Sulfate 50 mg/kg IV over 10 minutes (maximum individual dose: 2 g.)

Newborn Resuscitation

All Providers

- Note gestational age, and if twin gestation is known
- Assess for presence of meconium
- Assess breathing or presence of crying
- Assess muscle tone
- Assess color
- Provide warmth
- Open airway and suction with bulb syringe as soon as infant is delivered.
- Suction mouth first then nasopharynx
- Dry, stimulate and reposition
- Administer supplemental blow-by oxygen
- Evaluate respirations, heart rate and color
- If apnea or HR < 100, provide positive pressure ventilation using BVM and 100% oxygen
- If HR remain < 60, begin chest compressions
- Note APGAR scores at 1 and 5 minutes after birth and then sequentially every 5 minutes until VS have stabilized

Advanced Life Support

- If the fluid contains meconium and the newborn has absent or depressed respirations, decreased muscle tone or heart rate < 100 bpm
 - ⇒ Perform direct laryngoscopy immediately after birth (prior to any positive pressure ventilation) for suctioning of meconium from the airway
 - ⇒ Suction any visible meconium from the airway
 - ⇒ Pass ETT beyond the cords and withdraw slowly as suction is applied directly to the ET tube (the tube will act as a suction catheter)
 - ⇒ Repeat intubation and suctioning procedure X 1
 - ⇒ After tube is removed, apply positive pressure ventilation using a BVM and 100% oxygen
- Do not re-attempt intubation unless patient exhibits severe respiratory failure or apnea

Note: The tracheal suctioning procedure is not intended for the vigorous newborn with meconium-stained fluid that does not develop apnea or respiratory distress. In the event severe respiratory symptoms develop, proceed with tracheal suctioning as above.

- If apnea, or HR < 100, provide positive pressure ventilations with 100% oxygen
- If HR 60-100, and no increase with positive pressure ventilations with 100% oxygen
 - ⇒ Continue assisted ventilations
 - ⇒ Begin chest compressions
 - ⇒ Naloxone (Narcan) 0.01 mg/kg, IV/IO if respiratory depression in a newborn of a mother who received narcotics within 4 hours of delivery, use caution in infants born to opiate addicted mothers
 - ⇒ May Repeat Naloxone (Narcan) dose as needed to a max of 0.03 mg/kg
 - ⇒ Check blood glucose and treat glucose < 40 mg/dL
 - D12.5W at 4 ml/kg
 - ◇ **To make D12.5: draw up 1 ml of D50 and dilute with 3 ml of 0.9% NaCl**
- If HR remains < 60 begin chest compressions
 - ⇒ IV 0.9% NaCl KVO or lock
 - ⇒ If no IV access obtained after 3 attempts, or within 90 seconds, obtain IO access
 - ⇒ Naloxone (Narcan) 0.01 mg/kg, IV/IO if respiratory depression in a newborn of a mother who received narcotics within 4 hours of delivery, use caution in infants born to opiate addicted mothers
 - ⇒ May Repeat Naloxone (Narcan) dose as needed to a max of 0.03 mg/kg
 - ⇒ Epinephrine 0.01 mg/kg of a 1:10,000 solution
 - Repeat Epinephrine (same dose) every 3 to 5 minutes if no response
- Check blood glucose and treat glucose < 40 mg/dL
 - ⇒ D12.5W at 4 ml/kg
 - **To make D12.5: draw up 1 ml of D50 and dilute with 3 ml of 0.9% NaCl**
- Rapid transport

Contact Medical Control for any additional orders or questions

Overdose, Poisoning, or Ingestion: Pediatric

For any overdose or poisoning, contact should be made with the Regional Poison Control Center (RPCC), 1-800-222-1222. Whenever possible, determine the agent(s) involved, the time of the ingestion/exposure and the amount ingested. Bring empty pill bottles, etc., to the receiving facility.

Advanced Life Support

- If any symptoms present, perform Full Pediatric ALS Assessment and Treatment
- If respiratory depression is present and a narcotic overdose is suspected:
 - ⇒ Naloxone (Narcan) 0.1 mg/kg IV/IO/IM or IN via MAD (max. dose is 2 mg)

Treatment for specific toxic exposures is indicated only when patients are clearly symptomatic. In the absence of significant symptoms, monitor closely and expedite transport.

Organophosphates:

- Dyspnea, bronchorrhea, lacrimation, vomiting/diarrhea, weakness, paralysis, seizures:
 - ⇒ Atropine 0.02 mg/kg IV/IO (minimum dose 0.1 mg), repeat every 2 minutes if needed X 3 doses
 - ⇒ If seizures present, see **Pediatric Seizure Protocol**

Tri-cyclic Antidepressant:

- Hypotension, arrhythmias, wide QRS complex (>0.12 sec):
 - ⇒ Sodium Bicarbonate 1 mEq/kg IV/IO
 - May be repeated in 10 minutes

Beta Blocker overdose:

- Bradycardia, hypotension, heart blocks:
 - ⇒ Atropine 0.02 mg/kg IV/IO (minimum dose 0.1 mg, maximum dose 0.5 mg) for bradycardia
 - ⇒ If the symptoms persist, Glucagon 0.1 mg/kg IV/IO (Maximum dose 1 mg)

Calcium Channel Blocker overdose:

- ⇒ Calcium Chloride 20 mg/kg slow IV/IO (maximum dose 1g)

Dystonic Reactions:

- Acute uncontrollable muscle contractions
 - ⇒ Diphenhydramine (Benadryl) 1 mg/kg IV or IM (maximum dose 25 mg)

Insulin Overdose:

- Hypoglycemia or unknown blood glucose and altered mental status:
 - ⇒ Determine blood glucose and treat:
 - Neonates (≤ 2 months) < 40 mg/dL
 - ◇ D12.5W at 4 ml/kg
 - Child (2 months-12 years) < 70 mg/dL
 - ◇ D25W at 2 ml/kg

To make D12.5: draw up 1 ml of D50 and dilute with 3 ml of 0.9% NaCl

To make D25: draw up 1 ml of D50 and dilute with 1 ml of 0.9% NaCl

- OR -

- Glucagon 0.1 mg/kg IM (Maximum dose 1 mg) if IV or IO access unavailable
- ⇒ Repeat Dextrose X1 if blood glucose remains < 70 mg/dL (< 40 in a neonate) after treatment or unable to determine blood glucose and no change in mental status

Contact Medical Control for any additional orders or questions

Pain Management: Pediatric

All Providers

- General Pediatric Patient Care Protocol
- Assess baseline pain level (0-10 scale: 0=no pain; 10=worst pain)

Advanced Life Support

- Full ALS Pediatric Assessment and Treatment if administering narcotics
- Analgesic agents may be administered under standing orders for patients experiencing moderate/severe pain ($\geq 6/10$)
- Common complaints:
 - ⇒ Isolated extremity injury
 - ⇒ Burns (without airway, breathing, or circulation compromise)
 - ⇒ Sickle crisis
- Agents for pain control:
 - ⇒ Both are contraindicated if hypotensive:
 - Morphine Sulfate 0.1 mg/kg IV/IO
 - ◇ May repeat every 10 min x 1
 - Fentanyl 1.5 mcg/kg IN via MAD with one-half of the volume administered to each nare (max. individual dose 100 mcg)
 - ◇ May repeat one-half ($\frac{1}{2}$) the original dose after 10 minutes if needed.

DOSING: Fentanyl Concentration (50 mcg/ml), 0.1 ml=5 mcg

Weight (kg)	Dose (mcg)	Mg of 50 mcg/kg + 0.1 ml for dead space
3-5	10	0.2+0.1=0.3 mL
6-10	20	0.4+0.1=0.5 mL
11-15	30	0.6+0.1=0.7 mL
16-20	40	0.8+0.1=0.9 mL
21-25	50	1.0+0.1=1.1 mL
26-30	60	1.2+0.1=1.3 mL
31-35	70	1.4+0.1=1.5 mL
36-40	80	1.6+0.1=1.7 mL
41-45	90	1.8+0.1=1.9 mL
46-50	100	2.0* mL

* administer dose in two (2) separate administrations 10 minutes apart

- After each drug dosage administration:
- Reassess the patient's pain level
- Note adequacy of ventilation and perfusion
- Assess vital signs
- Continuously monitor oxygen saturation and end tidal CO₂

Contact Medical Control for any additional orders or questions

Seizure: Pediatric

All Providers

- Pediatric General Patient Care Protocol
- Supplemental 100% oxygen
 - ⇒ Nasal cannula is sufficient if no active seizures and no respiratory signs of symptoms
- Protect patient from injury
- Blood glucose check

Advanced Life Support

- Full Pediatric ALS Assessment and Treatment
- Determine blood glucose and treat:
 - ⇒ Neonates (≤ 2 months) < 40 mg/dL
 - D12.5W at 4 ml/kg
 - ⇒ Child (2 months-12 years) < 70 mg/dL
 - D25W at 2 ml/kg

To make D12.5: draw up 1 ml of D50 and dilute with 3 ml of 0.9% NaCl

To make D25: draw up 1 ml of D50 and dilute with 1 ml of 0.9% NaCl

- OR -

- Glucagon 0.1 mg/kg IM (Maximum dose 1 mg) if IV or IO access unavailable
 - Repeat Dextrose X1 if blood glucose remains < 70 mg/dL (< 40 in a neonate) after treatment or unable to determine blood glucose and no change in mental status.
 - For active seizures choose one of the following options:
 - ⇒ Lorazepam (Ativan) 0.05 mg/kg slow IV/IO via (max. individual dose 2 mg)
- OR -**
- ⇒ If no IV access, Midazolam (Versed) 0.2 mg/kg IN via MAD (Max individual dose 3 mg)
- OR -**
- ⇒ Patient-prescribed Diazepam rectal gel (Diastat[®]) if available

2-5 Years (0.5 mg/kg)		
Weight		Dose
(kg)	(lb)	(mg)
6-11	13-25	5
12-22	26-49	10
23-33	50-74	15
34-44	75-98	20

6-11 + Years (0.3 mg/kg)		
Weight		Dose
(kg)	(lb)	(mg)
10-18	22-41	5
19-37	42-82	10
38-55	83-122	15
56-74	123-164	20

- For seizure not controlled by the above, or if the seizure recurs after initial control, choose one of the following:
 - ⇒ Lorazepam (Ativan) 0.05 mg/kg slow IV (max individual dose 2 mg)
 - **OR** -
 - ⇒ If no IV access Midazolam (Versed) 0.2 mg/kg IN via MAD (max individual dose 3 mg)

Contact Medical Control for any additional orders or questions

Trauma: Pediatric

For major trauma criteria, a pediatric patient is anyone < 18 years of age

All Providers

- Pediatric Patient Care Protocol
- Stabilize spine
- Use modified jaw thrust if airway obstructed
- Supplemental 100% oxygen
- Control hemorrhage using direct pressure or pressure dressing
- Perform head-to-toe survey to identify injuries
- Splint obvious fractures of long bones
- Attempt to preserve body temperature

Advanced Life Support

- If moderate or severe injuries present, perform Full Pediatric ALS Assessment and Treatment
- Assess for Pediatric Trauma Triage Criteria and initiate transport to Pediatric Trauma Center
- Assess for Tension Pneumothorax
 - ⇒ Severe respiratory distress with hypoxia
 - ⇒ Unilateral decreased or absent lung sounds (may see tracheal deviation away from collapsed lung field)
 - ⇒ Evidence of hemodynamic compromise (shock, hypotension, altered mental status)

Pleural decompression for tension pneumothorax should only be performed when all 3 of the above criteria are present!

- If indicated, perform pleural decompression at 2nd intercostal space, mid-clavicular line
- Initiate transport to an appropriate trauma facility within 10 minutes of arrival on the scene, unless extenuating circumstances (extrication)
- Perform procedures, history and detailed physical examination en route to the hospital
- If moderate to severe pain, treat per **Pediatric Pain Management Protocol**
- Reassess frequently

Contact Medical Control for any additional orders or questions

Trauma: Pediatric Burns

All Providers

- General Pediatric Patient Care Protocol
- Remove or cool heat source if present (e.g., clothing, tar)
- Keep patient warm and dry with a sheet on all burns:
 - ⇒ 2° burns greater than 15% of body surface area
 - ⇒ 3° burns
 - ⇒ Electrical and chemical burns
- Spinal immobilization if high voltage electrical injuries

Advanced Life Support

- Observe for signs of impending loss of airway; Refer to the **Airway Management Protocol** as needed:
 - ⇒ Hypoxia
 - ⇒ Poor ventilatory effort
 - ⇒ Altered Mental status/decreased level of consciousness
 - ⇒ Inability to maintain patent airway
- If moderate to severe pain, treat per **Pediatric Pain Management Protocol**
- Estimate Total Body Surface Area (TBSA) burned
 - ⇒ If > 20% 2nd and 3rd degree TBSA burned, initiate volume resuscitation with 0.9 % Normal Saline, 20 ml/kg, repeat twice up to 60 ml/kg IV/IO

Contact Medical Control for any additional orders or questions

Trauma: Pediatric Head Injuries

All Providers

- Supplemental oxygen
- Stabilize spine
- Check blood glucose
- Apply physical restraints if needed to ensure patient/crew safety. Adhere to procedure on Physical Restraint of Agitated Patients when this process is deemed necessary
- If normotensive or hypertensive
 - ⇒ Elevated head of backboard 15°-30°

Advanced Life Support

- Full Pediatric ALS Assessment and Treatment
- Advanced airway/ventilatory management as needed

Note: Airway interventions can be detrimental to patients with head injury by raising intracranial pressure, worsening hypoxia (and secondary brain injury) and increasing risk of aspiration. Whenever possible these patients should be managed in the least invasive manner to maintain O₂ saturation > 90% (i.e., NRB, BVM with 100% O₂)

- Observe for signs of impending respiratory failure; Refer to the **Airway Management Protocol** if needed:
 - ⇒ Hypoxia
 - ⇒ Poor ventilatory effort
 - ⇒ Altered mental status/decreases level of consciousness
 - ⇒ Inability to maintain patent airway

For patients with assisted ventilation:

- Administer eucapnic (normal rate 12-15/min) ventilations
- Acute herniation should be suspected when the following signs are present:
 - ⇒ Abrupt increase in blood pressure
 - ⇒ Abrupt decrease in heart rate
 - ⇒ Acute unilateral dilated and non-reactive pupil
 - ⇒ Abrupt deterioration in mental status
 - ⇒ Abrupt onset of motor posturing
- Hyperventilation is a temporizing measure which is only indicated in the event of acute herniation

- If signs of herniation develop, begin hyperventilation
 - ⇒ If < 1 year old, 35/minute
 - ⇒ If > 1 year old, 25/minute
 - ⇒ Target an ETCO₂ of 30-35 mmHg
- If severely agitated/combatative and unable to deescalate by any other means, consider:
 - ⇒ Lorazepam 0.05 mg/kg IV/IO

Contact Medical Control for any additional orders or questions

- Any additional sedation

MEDICAL TREATMENT PROCEDURES

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12-Lead ECG

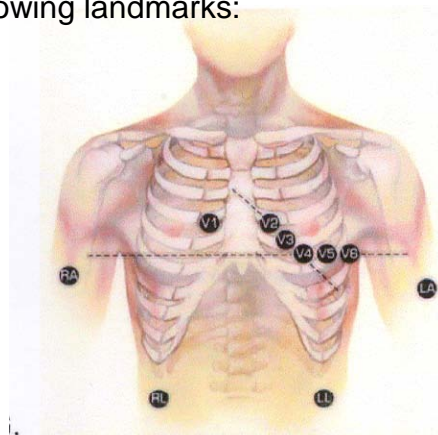
Clinical Indications:

- Suspected cardiac patient
- Suspected tricyclic overdose
- Electrical injuries
- Syncope
- CHF
- Abdominal pain above the umbilicus
- Undifferentiated respiratory complaints

	EMT	
P	EMT - P	P

Procedure:

1. Assess patient and monitor cardiac status.
2. If patient is unstable, definitive treatment is the priority. If patient is stable or stabilized after treatment, perform a 12 Lead ECG.
3. Prepare ECG monitor and connect patient cable to electrodes.
4. Expose chest and prep as necessary. Modesty of the patient should be respected.
5. Apply chest leads and extremity leads using the following landmarks:
 - RA - Right arm or as directed by manufacturer
 - LA - Left arm or as directed by manufacturer
 - RL - Right leg
 - LL - Left leg
 - V1 - 4th intercostal space at right sternal border
 - V2 - 4th intercostal space at left sternal border
 - V3 - Directly between V2 and V4
 - V4 - 5th intercostal space at midclavicular line
 - V5 - Level with V4 at left anterior axillary line
 - V6 - Level with V5 at left midaxillary line
6. Instruct patient to remain still.
7. Press the appropriate button to acquire the 12 Lead ECG.
8. Print data as per guidelines and attach a copy of the 12 lead to the Patient Care Report (PCR). Place the name and age of the patient on the paper copy of the ECG.
9. **Paramedic:** If STEMI identified, notify STEMI Receiving Center immediately. Report STEMI Alert. Detailed report to follow. If equipped, transmit 12 lead ECG as soon as obtained.
10. **Non-Paramedic:** Transmit 12 lead ECG as soon as obtained.
11. Document the procedure, time and results on/with the patient care report (PCR).
12. An EMT-Basic may perform a 12 Lead ECG; a Paramedic, however, should review it before implementing any treatment modalities.



Airway Orotracheal Intubation

Clinical Indications:



- Respiratory or cardiac arrest
- Inadequate ventilation with bag valve mask
- Impending respiratory failure:
 - ⇒ Decreased level of consciousness with, hypoxia unresponsive to 100% oxygen, apnea, and/or respiratory rate ≤ 8
 - ⇒ **OR** poor ventilatory effort (with hypoxia unresponsive to 100% oxygen)
 - ⇒ **OR** unable to maintain patent airway
- Airway obstruction or potential for airway obstruction (airway burns)

Equipment:

- Laryngoscope handle with appropriate size blade.
- Proper size endotracheal tube (ETT) plus back up ETT 0.5 – 1.0 mm smaller
- Water-soluble lubrication gel, (lubricate distal end of tube at cuff).
- 10 cc syringe (larger syringe if low pressure cuff)
- Stylet, (insert into ET tube and do not let stylet extend beyond tip of ET tube).
- Tape or ETT securing device.
- Proper size oral pharyngeal airway.
- BVM or automatic ventilator
- Oxygen source
- Suction device.
- Stethoscope
- ETCO₂ detection device (Capnography)
- Oxygen saturation monitor

Procedure:

- Patient/equipment preparation:
 - ⇒ Maintain cervical alignment and immobilization as appropriate
 - ⇒ Attach proper blade to laryngoscope handle and check light
 - ⇒ Check endotracheal tube cuff
 - ⇒ Raise gurney so that patient's nose is at intubator's xiphoid (if possible)
 - ⇒ Confirm patient attached to cardiac monitor and oxygen saturation monitor
 - ⇒ Ready ETCO₂ detection device

- ⇒ Specify personnel to:
 - Apply cricoid pressure
 - Keep neck immobile during procedure
 - Watch cardiac and oxygen saturation monitors
- Intubation:
 - ⇒ Preoxygenate patient with 100% Oxygen (BVM or NRB) before intubation attempt to achieve O₂ saturation > 92% for 5 minutes. Have assistant apply cricoid pressure (Sellick's maneuver) during entire procedure.
 - ⇒ Remove all foreign objects, such as dentures, oral pharyngeal airways, etc. and suction the patient's airway if needed. (Do not remove an esophageal located ETT if in place from prior attempt)
 - ⇒ Grasp laryngoscope handle in left hand.
 - ⇒ Grasp ET tube in right hand.
 - ⇒ Insert the blade into the right side of the patient's mouth sweeping the tongue to the left side.
 - ⇒ Visualize the vocal cords while avoiding any pressure on the teeth.
 - ⇒ Insert the endotracheal tube until the cuff passes the vocal cords. (Insert far enough so that balloon port tubing is even with lips.)
 - ⇒ Typical depth = tube size (ID) X 3 (example would be tube depth of 24 for a 8.0mm tube)
 - ⇒ Remove the laryngoscope blade.
 - ⇒ Inflate the endotracheal cuff with the syringe with 5 - 10 cc of air (low pressure cuff may require larger volume) and remove the syringe from inflation valve
 - ⇒ Confirm tube placement
 - ⇒ Ventilate with BVM and:
 - Observe immediate (within 6 breaths) ETCO₂ waveform and number with capnography
 - Watch for chest rise AND
 - Listen to abdomen to ensure tube is not esophageal
 - ⇒ Then, listen for bilateral breath sounds
 - ⇒ Observe oxygen saturation

Note: Regardless of the apparent presence of lung sounds, tube misting and chest rise, or lack of gastric sounds, if ETCO₂ does not indicate proper tube location (alveolar waveform), ETT must be removed.

- If unilateral right sided breath sounds are heard consider:
 - ⇒ Right mainstem intubation
 - ⇒ If present, deflate the cuff and withdraw tube 1-2 cm.
 - ⇒ Relisten for breath sounds.
- If bowel sounds heard with bagging or ETCO₂ device does not indicate proper ETT placement, deflate cuff, remove tube and ventilate with bag valve mask for 2 minutes
- If intubation attempt unsuccessful, refer to the next step in the Airway Management Protocol
- If successful tube placement:
 - ⇒ Secure tube using an endotracheal securing device
 - ⇒ Document depth of tube.
 - ⇒ Reassess lung sounds and patient clinical status
 - ⇒ Insert oral pharyngeal airway, or use ET tube holder with built in bite block (if available)
 - ⇒ Ensure c-spine is still immobilized
 - ⇒ Continue ventilations
 - ⇒ Document ETCO₂ waveform and reading continuously- at time of each patient movement, including waveform and reading at time of transfer of care at the emergency department (ED).

Airway Suctioning – Basic

	EMT	
P	EMT - P	P

Clinical Indications:

- Obstruction of the airway (secondary to secretions, blood, or any other substance) in a patient who cannot maintain or keep the airway clear.

Procedure:

1. Ensure suction device is in proper working order with suction tip in place.
2. Preoxygenate the patient.
3. Explain the procedure to the patient if they are coherent.
4. Examine the oropharynx and remove any potential foreign bodies or material that may occlude the airway if dislodged by the suction device.
5. If applicable, remove ventilation devices (e.g., bag-valve mask) from the airway.
6. Use the suction device to remove any secretions, blood, or other substance.
7. The alert patient may assist with this procedure.
8. Reattach ventilation device (e.g., bag-valve mask) and ventilate or assist the patient.
9. Record the time and result of the suctioning in the patient care report (PCR).

Airway Suctioning – Advanced

Clinical Indications:



- Obstruction of the airway (secondary to secretions, blood, or any other substance) in a patient currently being assisted with an airway adjunct such as a LTA/LMA, endotracheal tube, tracheostomy tube, or a cricothyrotomy tube.

Procedure:

1. Ensure suction device is in proper working order.
2. Preoxygenate the patient.
3. Attach suction catheter to suction device, keeping sterile plastic covering over catheter.
4. For all devices, use the suprasternal notch as the end of the airway. Measure the depth desired for the catheter (judgment must be used regarding the depth of suctioning with cricothyrotomy and tracheostomy tubes).
5. If applicable, remove ventilation devices (e.g., bag-valve mask) from the airway.
6. With the thumb port of the catheter uncovered, insert the catheter through the airway device.
7. Once the desired depth (measured in #4 above) has been reached, occlude the thumb port and remove the suction catheter slowly.
8. Small volume (< 10 ml) of normal saline lavage may be used as needed.
9. Reattach ventilation device (e.g., bag-valve-mask) and ventilate the patient.
10. Document time and result in the patient care report (PCR).

Blood Glucose Analysis

Clinical Indications:

	EMT	
P	EMT - P	P

- Patients with suspected hypoglycemia (diabetic emergencies, altered/change in mental status, bizarre behavior, etc.)

Procedure:

1. Gather and prepare equipment.
2. Blood samples for performing glucose analysis should be obtained simultaneously with intravenous access when possible.
3. Place correct amount of blood on reagent strip or site on glucometer per the manufacturer's instructions.
4. Time the analysis as instructed by the manufacturer.
5. Document the glucometer reading and treat the patient as indicated by the analysis and protocol.
6. Repeat glucose analysis as indicated for reassessment after treatment and as per protocol.

Cardioversion

Clinical Indications:



- **Unstable** patient with a tachydysrhythmia (rapid atrial fibrillation, supraventricular tachycardia, ventricular tachycardia)
- Patient is not pulseless (the pulseless patient requires unsynchronized cardioversion, i.e., defibrillation)

Procedure:

1. Ensure the patient is attached properly to a monitor/defibrillator capable of synchronized cardioversion.
2. Have all equipment prepared for unsynchronized cardioversion/defibrillation if the patient fails synchronized cardioversion and the condition worsens.
3. Consider the use of pain medication or sedatives per protocol.
4. Set energy selection to the appropriate setting.
5. Set monitor/defibrillator to **synchronized cardioversion** mode.
6. Make certain all personnel are clear of patient.
7. Press and hold the shock button to cardiovert. Stay clear of the patient until you are certain the energy has been delivered. NOTE: It may take the monitor/defibrillator several cardiac cycles to “synchronize”, so there may be a delay between activating the cardioversion and the actual delivery of energy.
8. Note patient response and perform immediate unsynchronized cardioversion/defibrillation if the patient’s rhythm has deteriorated into pulseless ventricular tachycardia/ventricular fibrillation. Follow the procedure for Defibrillation-Manual.
9. If the patient’s condition is unchanged, repeat steps 2 to 8 above, using escalating energy settings per protocol.
10. Repeat per protocol until maximum setting or until efforts succeed.
11. Note procedure, response, and times in the patient care report (PCR).

Cardio-Cerebral Resuscitation (CCR)



Clinical Indications:

- Age \geq 18 years of age (CCR causes worse outcomes in the pediatric population)
- Suspected cardiac cause of arrest (not respiratory-OD, drowning etc.)

*It occurs with Ventricular Fibrillation or Pulseless Ventricular Tachycardia, with PEA and with Asystole. You must assume there is no blood perfusing the brain and heart...which is bad for survival. Your patient needs **both** a pump (chest compressions) and diastolic pressure support (to perfuse the coronary arteries). Time spent doing other things (such as prolonged airway management) at the expense of **not** delivering pump support is not good for the patient.*

Determine as close as possible when the patient collapsed, and document this. Also look for any signs of patient gasping prior to and/or during resuscitation, and document this. If gasping is present, note pupil reaction and document also.

It is also important to remember that not all Pulseless patients are the result of cardiac related events. Other mechanisms such as trauma, drowning, hypothermia, choking and other respiratory problems, etc. must be considered as a possible cause for the arrest and should be addressed with immediate, appropriate airway intervention.

Key points in the Cardio Cerebral Resuscitation (CCR) approach:

- Survival is determined by a functional recovery of **two** organs: the heart **and** the brain.
 - ⇒ Without adequate **blood flow** neither organ will survive.
 - ⇒ That makes properly performed **chest compressions** (CC) the single most important determinant of survival.
 - ⇒ Anything that interrupts or otherwise decreases the quality of CC contributes to the death of your patient.
 - ⇒ This concept – continuous maximal quality CC – must become the foundation of all you think and do during resuscitation!
- All patients are treated the same during the first 2 minutes of the code.
 - ⇒ They get uninterrupted continuous CC (CCC) while other interventions are performed.
 - ⇒ The cardiac rhythm is irrelevant during this period.
- The cardiac rhythm determines subsequent management.
 - ⇒ It is analyzed (using manual interpretation) briefly **AFTER** each set of 200 CCC.
 - ⇒ It is either shockable or non-shockable – don't make it more complicated than that.

- CCCs are to be resumed immediately following a rhythm assessment \pm shock.
 - ⇒ The rhythm observed after a shock is not – meaning **NOT** – to be treated!
 - ⇒ Otherwise deadly pauses in CCC will be introduced in an attempt to gather information that is irrelevant to survival!
- The initial rhythm (after 200 CCC) determines subsequent treatments:
 - ⇒ When to initiate invasive airway insertion and positive pressure ventilation.
 - ⇒ Need for anti-arrhythmic medications.
 - ⇒ How long to remain on scene.
- Success depends on:
 - ⇒ Leadership
 - ⇒ Delegation of a limited set of specific tasks.
 - ⇒ Timely focused completion of these specific tasks by rescuers.
- Interventions that are critical to survival **MUST** whenever possible be performed by two persons solely dedicated to that task.
 - ⇒ One to perform it and a second person to assure quality performance.
 - ⇒ This applies especially to chest compressions and it is also important in the management of an invasive airway + ventilations.

Code Commander:

- Someone must assume the role of code commander. This person is responsible for delegating tasks, is the **only** person interpreting the rhythm, and is responsible for monitoring/critiquing the overall performance of the team.
- Other members must work as a team and take direction from the code commander. They must focus on their assigned tasks and let the code commander manage the overall response (in other words, keep their noses out of other rescuers business)

Critical first tasks: (delegated and performed in first two minutes if at all possible)

- **MCMAID** – a prioritized sequence consisting of:
 - ⇒ **M** = Metronome (100/min)
 - ⇒ **C** = Chest compressions (focus on rate, recoil and depth)
 - ⇒ **M** = Monitor (turn on in defib mode, pads on, joules set at maximum)
 - ⇒ **A** = Airway (OPA, ensure patency, NRB @ 15/lpm)
 - ⇒ **I** = Intravenous or Intraosseous access
 - ⇒ **D** = Drugs (Epi, Vasopressin, Amiodarone)(be ready to administer when needed and monitor timing for repeat doses)

Chest Compressions: MCMAID

- **M**etronome should be turned on to assure a rate of 100/minute.
- **C**CC should be started ASAP after arrival.
- A two-person task if at all possible.
 - ⇒ Switch compressors rapidly/frequently (every 1 or 2 minutes).
 - ⇒ The non-compressor continuously monitors the quality of CCC: rate, depth, and recoil.
- CCC should be continuous = not interrupted.
 - ⇒ The only valid reasons for interrupting compressions are for analyzing the rhythm and shocking.
 - ⇒ All other requests to pause CCC must be cleared by the code commander, and the reason and duration documented in the run report.

Monitor/Defibrillator: MCMAID

- Initial:
 - ⇒ Turn unit on when compressions are started and set mode to defib.
 - ⇒ Ensure joules are set to maximum allowed. (200 for Zoll/360 Physio)
 - Place pads in sternum/apex position without interruption of chest compressions.
- Defibrillation process:
 - ⇒ Charge defibrillator during the last 10 seconds of 200 CCC.
 - ⇒ Ensure all rescuers will be clear if a shock is needed.
 - ⇒ Pause a few seconds only for analysis – determine if it is shockable or not.
 - If indicated, immediately deliver a single (not stacked) shock at maximum joules.
 - If no shock is indicated, dump the charge by either decreasing the energy level and immediately returning back to maximum energy setting (200 J or 360J), OR switching the mode to monitor and then quickly back to defib mode.
 - ⇒ Immediately resume CCC after analysis ± shock.
 - The pause from stopping CCC to resumption of CCC should be less than 5 seconds.

Airway: MCMAID

- Initially:
 - ⇒ Insert OPA, apply NRB @ 15/lpm (look for misting), ensure patency (listen for exhausted air with compressions. If unsure, give one single breath with BVM, looking for chest rise and feeling for compliance).
- When to insert invasive airway depends on the **initial** rhythm:
 - ⇒ If **non-shockable**, initiate immediately after first rhythm analysis.
 - ⇒ If **shockable** – **ONLY after** three cycles (2 min. of CCC + analysis ± shock). **NOT earlier**, even if second rhythm is non-shockable.
- Once the invasive airway is in place, the airway persons sole task is to perform/monitor that task and no other.
- Invasive airway monitoring includes attention to:
 - ⇒ Proper placement.
 - ⇒ Apply Capnography and verify waveform/presence of ETCO₂.
 - ⇒ Avoidance of **any** interruption of CCC
 - ⇒ Ventilation rate of 6 per minute. Each breath must be timed – aim for 10 seconds between each breath. **Excessive ventilation rates are deadly!**
 - ⇒ Volume should be ~ 500 cc.
 - ⇒ Delivery of breath should be over one second.
- Use a LTA if placing an endotracheal tube is met with **any** problems or delays.
- If the initial rhythm is shockable, seriously consider using the LTA instead of an ETT because these patients cannot tolerate even brief periods of less than optimal CCC.
- Assure that oxygen is attached.

Intravenous/Intraosseous access: MCMAID

- Consider intraosseous route whenever there are any delays in IV insertion.
- Consider spiking a bag en route and having it ready on arrival.

Drugs: MCMAID

- The individual assigned to the Drug “task”:
 - ⇒ Initially ensures medications are available and ready to administer.
 - ⇒ Is responsible for:
 - The rapid administration when indicated.
 - Re-dosing at appropriate intervals.

- Detecting when V-Fib is persistent or recurrent, and therefore indicating the use of Amiodarone.
- Accurate timing of when meds are to be given (to the second – using elapsed time since defibrillator was turned on.)
- Vasopressors should be given ASAP after analysis \pm shock, so their effect will be seen after the next 200 chest compressions.
- **Epinephrine** first!
 - ⇒ **The one exception is the patient who you suspect may get return of spontaneous circulation with the first shock. Such patients may include those with short down times or those who have had excellent chest compression generated perfusion. A clue to this is the presence of regular agonal respirations (gaspings). In these patients consider giving Vasopressin initially, and reserving Epinephrine until the code commander observes persistent pulseless V-fib/Tach after the first shock – or until another 200 CCC cycle has been completed.
 - ⇒ Epi dose is 1mg IV/IO. Endotracheal administration is not to be utilized - start an IO instead.
 - ⇒ If repeating doses, administer every other cycle of 200 compressions. (equivalent to every 4 min)
- **Vasopressin**: administer with first Epi dose as per protocol.
 - ⇒ Dose is 40 units (two vials of 20 U each).
 - ⇒ Same dose is used for IV, intraosseous (IO) routes, or as a last resort endotracheal.
 - ⇒ If resuscitation process is expected to be prolonged, a second dose of 40 units of Vasopressin may be given 10 minutes or more after the first dose.
- **Amiodarone** is administered for persistent or recurrent pulseless V-fib/Tach. This should be administered immediately during the next 200 chest compression cycle if a second shock was indicated and delivered at time of analysis. The code commander may visualize return of fibrillation during the 200 CCC and as such may order Amiodarone earlier since it has recurred.
 - ⇒ Dose is 300 mg IV/IO.
 - ⇒ Repeat doses are 150 mg IV/IO.

Additional treatments to consider:

- Consider possible renal failure (hyperkalemia) or suspected Tricyclic antidepressant overdose. If suspected, administer **Sodium Bicarbonate** 1mEq/Kg. If renal failure is suspected, also administer **Calcium Chloride** 1g IVP.

- If rhythm is persistent shockable V-Fib or Pulseless V-Tach, consider the possible use of **Magnesium Sulfate** 2g IVP.
- If the patient is successfully converted from V-Fib/Pulseless V-Tach to a perfusing sustainable rhythm, consider post resuscitation Amiodarone boluses.
 - ⇒ **Amiodarone bolus:** 150mg
- If rhythm is a non-shockable Asystole or PEA, seek out and treat any possible contributing factors.
- Also consider external pacing: for PEA. Apply the pads in (or move them to) the anterior/posterior position, attach the 4-lead cable, and set the pacer at the maximum milliamps at a rate of 80/min. Do **NOT** interrupt compressions while attempting pacing.

When to stop CCC:

- If the patient shows signs of cerebral activity and the rhythm is non-shockable.
- Use end-tidal CO₂ as a marker for possible ROSC. Look for a dramatic increase.
- Pulse checks are **ONLY** performed during brief rhythm analysis with location of carotid pulse ascertained during chest compressions.
 - ⇒ This may be modified by the code commander if cerebral function signs of life appear.
 - ⇒ The code commander is the only individual who can order a pulse check other than that done during rhythm analysis.
 - ⇒ The code commander must ensure the pulse checker is clear if a shock is indicated.

When to move patient:

- Remember that moving a patient inevitably results in compromised quality of compressions. If crew safety is compromised or inadequate resuscitation space is available, patient should be quickly moved to a safe or larger area. This should be done initially and not after resuscitation efforts have begun.
- Initially shockable patients will live or die in the field!
 - ⇒ Move is allowed after 3 cycles are completed and a non-shockable rhythm is identified at the 3rd analysis.
 - If 3rd analysis is still shockable, continue resuscitation at the scene until a non-shockable rhythm is encountered.

- Initially non-shockable rhythms
 - ⇒ Medical control must make this determination, but these patients may deserve at least 3 cycles of treatment with optimal quality compressions.

Avoid excessive pauses:

- Rhythm analysis - **Only** the Code commander pays attention to the rhythm (not everyone).
- Resume CCC immediately after analysis \pm shock. The code commander must assure this happens.
- Charging - perform during last 10 seconds of 200 chest compressions.
- During Intubation - It is the responsibility of both the code commander and the second airway person to avoid pauses in CCC here. This **MUST** be able to be performed without any interruption of compressions! Consider using the LTA if unable to intubate effectively.
- Pulse checks - only performed during the rhythm analysis pause; must be correlated with rhythm.

Chest Decompression

Clinical Indications:



- Tension pneumothorax should be suspected in patients who exhibit:
 - ⇒ Severe respiratory distress with hypoxia
 - ⇒ Unilateral decreased or absent lung sounds
 - ⇒ Evidence of hemodynamic compromise (Shock, hypotension, tachycardia, altered mental status)
 - ⇒ Tracheal deviation away from the collapsed lung field (less reliable than the above)
- Pleural decompression for tension pneumothorax should only be performed when at least 3 of the above criteria are present

Equipment:

- 14 gauge 2 inch - 2.5 inch over the needle catheter.
- Tape
- Sterile gauze pads
- Antiseptic swabs
- Occlusive dressing

Procedure:

- Locate decompression site.
 - ⇒ **Identify the 2nd intercostal space in the mid-clavicular line on the same side as the pneumothorax.**
- Prepare the site with an antiseptic swab:
 - ⇒ *Firmly introduce catheter immediately above distal rib of selected site*
- Insert the catheter into the thorax until air exits.
- Advance catheter and remove needle.
- Secure the catheter taking care not to allow it to kink.
- Reassess lung sounds and patient condition.
- Dress area with Occlusive dressing then cover with sterile gauze pad.
- Assess breath sounds and respiratory status.

Childbirth Complications



Shoulder Dystocia:

- Place mother in knee-chest position and reattempt delivery.
- If delivery fails, support child's airway, provide supplemental oxygen.

Breech Birth:

- Do not attempt to pull infant by trunk or legs.
- Place mother in knee-chest position.
- If head does not deliver, push baby's mouth and nose away from vaginal wall with two gloved fingers. Provide supplemental oxygen to infant.

Prolapsed Cord:

- Place mother in knee-chest position.
- Do not push cord back into birth canal.
- Insert gloved fingers into birth canal and keep pressure off prolapsed cord.
- Cover exposed cord with warm moist dressing.

Meconium-Stained Amniotic Fluid:

- Suction mouth and nose after delivery
- If baby is vigorous (normal respiratory effort, muscle tone, and heart rate \geq 100), provide supportive care.
- If baby is not vigorous (depressed respirations, poor muscle tone, or heart rate $<$ 100), perform endotracheal intubation and suction trachea while removing ET tube, may repeat one additional time.
- Support ventilation and re-intubate with a clean tube as per DCALS Protocols.

Childbirth Procedure

	EMT	
P	EMT - P	P

Clinical Indications:

Active labor with perineal crowning

- Apply personal protective equipment and prepare for childbirth
- Allow head to deliver passively and control delivery by placing palm of hand over occiput.
- Protect perineum with pressure from other hand
- If amniotic sac is still intact, gently pinch and twist to manually rupture.
- Note presence or absence of meconium.
- If meconium is present, see Complications of Child Birth
- Once the head is delivered and passively turns to one side, suction mouth and nose
- If nuchal cord present, gently lift cord from around infant's neck
- Gently apply downward pressure to infant to facilitate delivery of upper shoulder
- Once upper shoulder has delivered, apply gentle upward pressure to deliver lower shoulder.
- Grasp the infant as it emerges from birth canal.
- Keep infant at level of perineum until cord stops pulsating and cord is clamped.

Care of the Newborn:

- Clamp cord at 6 inches and 8 inches, once it stops pulsating cut cord
- Suction mouth and nose
- Dry and warm the neonate. Wrap in blankets
- Stimulate infant by rubbing back or soles of feet.
- Refer to Neonatal Resuscitation Protocol if infant is hypoxic, not breathing properly or heart rate < 100
- Obtain APGAR Score

	0	1	2
Appearance	Blue	Peripheral Cyanosis	Pink
Pulse	Absent	< 100 / minute	> 100 / minute
Grimace	No response	Grimace	Cough/Sneeze
Activity	Limp	Minimal movement	Active Motion
Respiratory Effort	Absent	Weak Cry	Strong Cry

Post Partum Care:

- Allow placenta to deliver spontaneously while transporting patient to hospital. Do not pull on cord.
- Apply direct pressure to any actively bleeding areas on the perineum
- If blood loss significant or vaginal bleeding continues
 - ⇒ Fluid bolus as needed
 - ⇒ Massage top of uterus
 - ⇒ Allow newborn to nurse / breast feed if stable

Combat Application Tourniquet (CAT)

Clinical Indications:



Extremity injury/amputation with uncontrollable hemorrhage despite aggressive direct pressure.

Procedure:

- Apply tourniquet device as proximal on extremity as possible (see procedure below)
- Secure in place and expedite transport to Level 1 Trauma Center
- Document time placed on chart and on device (if possible)
- Notify receiving center of presence, time placed, and location of tourniquet

1. Route the Self-Adhering Band Around the extremity and pass the free-running end of the band through the inside slit of the friction adaptor buckle.



2. Pass the band through the outside slit of the buckle, utilizing the friction adaptor buckle which will lock the band in place.



3. Pull the Self-Adhering Band tight and securely fasten the band back on itself.



4. Twist the rod until bright red bleeding has stopped.



5. Lock the rod in place with the Windlass Clip.™



6. Hemorrhaging is now controlled. Secure the rod with the strap: Grasp the Windlass Strap™, pull it tight, and adhere it to the opposite hook on the Windlass Clip.™



Continuous Positive Airway Pressure (CPAP)

	EMT	
P	EMT - P	P

Clinical Indications:

For patients with Acute Bronchospastic Disorders (acute or chronic bronchitis, emphysema, or asthma) or Acute Pulmonary Edema, who have hypoxemia and/or respiratory distress that does not quickly improve with pharmaceutical treatment.

Consider CPAP protocol if 2 or more present:

- Retraction of intercostals or accessory muscles
- Bronchospasm
- Rales
- Respiratory rate > 25 per minute.
- Oxygen saturation <92% on high flow oxygen

Contraindications:

- Respiratory arrest
- Agonal respirations
- Unconsciousness or obtundation
- Shock associated with cardiac insufficiency
- Trauma
- Persistent nausea and vomiting
- Facial anomalies
- Inability to cooperate with the procedure

Equipment:

- Medical Director approved Continuous Positive Airway Pressure (CPAP) device

Procedure:

- Perform primary and secondary surveys
- Attach cardiac monitor, +/- capnography, and pulse oximetry
- Verbally instruct patient (this is a critical item)
 - ⇒ Patient requires verbal sedation to use this device effectively

- ⇒ Setup CPAP device as per manufacturer's instructions
- ⇒ Instruct patient to slowly breathe in through the nose and exhale through the mouth (exhalation phase should be about 4 seconds)
- ⇒ For CHF/ACPE use a CPAP setting of 10cm H₂O
- ⇒ For COPD use a CPAP setting of 5cm H₂O
- Continue treatment throughout transport to the ED
- Record and monitor vital signs, ETCO₂, and O₂ saturation as needed/available.
- In the event of progressive respiratory failure:
 - ⇒ Offer reassurance
 - ⇒ Stop treatment if necessary
 - ⇒ Institute BLS and ALS care per DCALS protocols
 - ⇒ Document adverse reactions, and reasons why CPAP was discontinued, in patient care report
- The following items should also be documented:
 - ⇒ CPAP level used
 - ⇒ FiO₂ level used

Cardiopulmonary Resuscitation (CPR)

Clinical Indications:

	EMT	
P	EMT - P	P

- Pediatric arrest
- Suspected non-cardiac arrest/respiratory arrest in adult patients (i.e., overdose, drowning)

Procedure:

- Assess the patient's level of responsiveness (shake and shout).
- If no response, open the patient's airway with the head-tilt, chin-lift. Look, listen, and feel for respiratory effort. If the patient may have sustained C-spine trauma, use the modified jaw thrust while maintaining immobilization of the C-Spine. For infants, positioning the head in the sniffing position is the most effective method for opening the airway.
- If patient is an adult, go to step 4. If no respiratory effort in the pediatric patient, give two ventilations. If air moves successfully, go to step 4. If air movement fails, proceed per AHA obstructed airway guidelines.
- Check for pulse (carotid for adults and older children, brachial or femoral for infants) for at least 10 seconds. If no pulse, begin chest compressions as directed below:

Age	Location	Depth	Rate
Infant	Over sternum, between nipples (inter-mammary line), 2-3 fingers	1.5 inches (1/3 the anterior-posterior chest dimension)	At least 100/minute
Child	Over sternum, between nipples, heel of one hand	2 inches (1/3 the anterior-posterior chest dimension)	At least 100/minute
Adult	Over sternum, just above the xyphoid process, hands with interlocked fingers	At least 2 inches (1/3 the anterior-posterior chest dimension)	At least 100/minute

- Go to Cardiac Arrest procedure.
- Chest compressions should be provided in an uninterrupted manner. Only brief interruptions are allowed for rhythm analysis and defibrillation.
- Document the time and procedure in the Patient Care Report (PCR).

Cricothyrotomy Guidelines: Pertrach

**CONTACT MEDICAL CONTROL IF POSSIBLE
BEFORE PROCEEDING!**



Clinical Indications:

- When all airway management measures have failed and the patient needs an advanced airway immediately, consider performing cricothyrotomy. The percutaneous approach is preferred.
- If in the paramedics' judgment, the time necessary to contact medical control will compromise the patient's chance of survival AND it is not possible to ventilate the patient with a bag-valve-mask during transport, cricothyrotomy may be performed without Medical Control.

Relative Contraindications:

- Ability to ventilate patient with an oral-pharyngeal/nasal-pharyngeal airway, bag-valve-mask, LTA/LMA, or endotracheal tube.

Procedure:

1. Cleanse anterior neck.
2. Identify and mark cricothyroid membrane.
3. Fill a 10 cc syringe with 5 cc's of 0.9% Normal Saline
4. Remove dilator from the package and sheath and advance into the tracheostomy tube.
5. Penetrate the skin and cricothyroid membrane with the splitting needle perpendicular to the skin while gently aspirating with the syringe. Air aspiration as evidenced by bubbles into syringe should flow easily confirming tracheal airspace. Incline needle more than 45 degrees toward carina and complete insertion of needle aspirating to ensure continued proper placement.
6. Disconnect needle from syringe and advance tip of dilator into the hub of the splitting needle until resistance met.
7. Squeeze wings of needle together then, open them out completely to split the needle. Remove needle, continuing to pull it apart in opposite directions, while leaving the dilator in the trachea.
8. Place thumb on dilator knob while first and second fingers are curved under flange of trachea tube. By exerting pressure, advanced dilator and tracheostomy tube into position until flange is against skin.
9. Remove dilator and inflate cuff until you have control of the airway (max 5 cc's). Attach EtCO₂ and BVM. Secure tube around patient's neck with twill tape.
10. Confirm placement with gentle ventilation via bag-valve-mask, continuous Capnography and physical means. Be sure air movement is fluid with bilateral symmetric chest rise and that no visible neck soft-tissue distortion is noted.
11. If tracheal placement is unclear, remove and convert to open surgical cricothyrotomy procedure.
12. Secure tube and consider sedation per protocol.
13. If not previously done, immediately notify medical control physician.

Cricothyrotomy Guidelines: Open Surgical

**CONTACT MEDICAL CONTROL IF POSSIBLE
BEFORE PROCEEDING!**



Clinical Indications:

- When all airway management measures have failed and the patient needs an advanced airway immediately, consider performing cricothyrotomy. The percutaneous approach is preferred.
- If in the paramedics' judgment, the time necessary to contact medical control will compromise the patient's chance of survival AND it is not possible to ventilate the patient with a bag-valve-mask during transport, cricothyrotomy may be performed without Medical Control.

Relative Contraindications:

- Ability to ventilate patient with oral-pharyngeal/nasal-pharyngeal airway, bag-valve-mask, LTA/LMA, or endotracheal tube.

Procedure:

1. Cleanse anterior neck.
2. Identify and stabilize thyroid cartilage with non-dominant thumb and 3rd finger and identify the cricothyroid membrane with your non-dominant index finger. Do not release hand until tracheal hook is stabilizing cartilage.
3. Make a vertical incision 3 centimeters long above the cricothyroid membrane and re-identify cricothyroid membrane with index finger.
4. Complete incision through pretracheal fascia to the level of the cricoid and thyroid cartilage with a second scalpel blade pass.
5. Re-identify cricothyroid membrane with index finger and incise membrane with single horizontal stab.
6. Use tracheal hook to secure thyroid cartilage. Once thyroid cartilage stabilized/secure, release tracheal cartilage with non-dominant hand. Then hold tracheal hook with gentle upward/proximal traction (towards chin).
7. Use scalpel blade handle to dilate cricothyroid membrane incision (dominant index finger may be used as well).
8. Insert cuffed 6.0 ETT through incised cricothyroid membrane. If unable to pass, attempt 5.5, 5.0, 4.5 ETT sequentially. Use the largest size able to be passed.
9. Confirm with continuous Capnography as well as physical signs, watching carefully for any signs of air filtration into the neck. If any question remains regarding tracheal placement, remove immediately and repeat procedure beginning at Step #6.
10. Secure ETT and trim length of ETT to 2 cm above pilot balloon cuff. Take off and reinsert adaptor to shortened tube and bag with bag-valve-mask.
11. Secure tube and consider sedation per protocol.
12. If not previously done, immediately notify Medical Control.

Pearls:

- Open surgical cricothyrotomy is a blind, bloody procedure that should be performed only as a last resort life-saving intervention.
- Use extreme caution with scalpel as operator biohazard exposure from scalpel is extremely common.

Decontamination

Clinical Indications:

	EMT	
P	EMT - P	P

Any patient who may have been exposed to significant hazardous materials, including chemical, biological, or radiological weapons.

Procedure:

1. In coordination with HazMat and other Emergency Management personnel, establish hot, warm, and cold zones of operation.
2. Ensure that personnel assigned to operate within each zone have proper personal protective equipment.
3. In coordination with other public safety personnel, assure each patient from the hot zone undergoes appropriate initial decontamination. This is specific to each incident; such decontamination may include:
 - Removal of patients from Hot Zone
 - Simple removal of clothing
 - Irrigation of eyes
 - Passage through high-volume water bath (e.g., between two fire apparatus) for patients contaminated with liquids or certain solids. Patients exposed to gases, vapors, and powders often will not require this stop as it may unnecessarily delay treatment and/or increase dermal absorption of the agent(s).
4. Initial triage of patients should occur after step #3. Immediate life threats should be addressed prior to technical decontamination.
5. Assist patients with technical decontamination (unless contraindicated based on #3 above). This may include removal of all clothing and gentle cleansing with soap and water. All body areas should be thoroughly cleansed, although overly harsh scrubbing which could break the skin should be avoided.
6. Place triage identification on each patient. Match triage information with each patient's personal belongings, which were removed during technical decontamination. Preserve these personnel effects for law enforcement.
7. Monitor all patients for environmental illness.
8. Transport patients per local protocol.

Defibrillation—Automated

	EMT	
P	EMT - P	P

Clinical Indications:

- Patients in cardiac arrest (pulseless, non-breathing).
- Age <8 years, use Pediatric Pads if available.

Contraindications:

- Pediatric patients whose body habitus is such that the pads cannot be placed without touching one another.

Procedure:

1. **If multiple rescuers available, one rescuer should provide uninterrupted chest compressions while the AED is being prepared for use.**
2. Apply defibrillator pads per manufacturer recommendations. Use alternate placement when implanted devices (pacemakers, AICD's) occupy preferred pad positions.
3. Remove any medication patches on the chest and wipe off any residue.
4. If necessary, connect defibrillator leads: white to the anterior chest pad and the red to the posterior pad.
5. Activate AED for analysis of rhythm.
6. **Stop CPR and clear the patient** for rhythm analysis. Keep interruption in CPR as brief as possible.
7. Defibrillate if appropriate by depressing the “shock” button. **Assertively state “CLEAR” and visualize that no one, including yourself, is in contact with the patient prior to defibrillation.** The sequence of defibrillation charges is preprogrammed for monophasic defibrillators. Biphasic defibrillators will determine the correct joules accordingly.
8. Begin CPR (chest compressions and ventilations) immediately after the delivery of the defibrillation.
9. After 2 minutes of CPR, analyze rhythm and defibrillate if indicated. Repeat this step every 2 minutes.
10. If “no shock advised” appears, perform CPR for two minutes and then reanalyze.
11. Transport and continue treatment as indicated.
12. **Keep interruption of CPR compressions as brief as possible. Adequate CPR is a key to successful resuscitation.**

If pulse returns: See Post-Resuscitation protocol.

Defibrillation – Manual

Clinical Indications:



- Cardiac arrest with ventricular fibrillation or pulseless ventricular tachycardia.

Procedure:

1. Ensure chest compressions are adequate and interrupted only when necessary.
2. Clinically confirm the diagnosis of cardiac arrest and identify the need for defibrillation.
3. Apply hands-free pads to the patient's chest in the proper position.
4. Charge the defibrillator to the maximum energy level. Continue chest compressions while the defibrillator is charging.
5. Pause compressions, assertively state, "CLEAR" and visualize that no one, including yourself, is in contact with the patient.
6. Deliver the countershock by depressing the shock button for hands-free operation.
7. Immediately resume chest compressions and ventilations for 2 minutes. After 2 minutes of CPR, analyze rhythm and check for pulse only if appropriate for rhythm.
8. Repeat the procedure every two minutes as indicated by patient response and ECG rhythm.
9. Keep interruption of compressions as brief as possible. Adequate compressions are the key to successful resuscitation.

Endotracheal Tube Introducer (Bougie)

Clinical Indications:



- Patients meet clinical indications for oral intubation.
- Initial intubation attempt(s) unsuccessful.
- Predicted difficult intubation.

Contraindications:

- Two attempts at orotracheal intubation (utilize failed airway protocol).
- ETT size less than 6.5 mm.

Procedure:

1. Prepare, position, and oxygenate the patient with 100% oxygen.
2. Select proper ET tube without stylette, test cuff and prepare suction.
3. Lubricate the distal end and cuff of the endotracheal tube (ETT) and the distal ½ of the Endotracheal Tube Introducer (Bougie) (note: Failure to lubricate the Bougie and the ETT may result in being unable to pass the ETT).
4. Using laryngoscopic techniques, visualize the vocal cords if possible using Sellick's/BURP as needed.
5. Introduce the Bougie with curved tip anteriorly and visualize the tip passing the vocal cords or above the arytenoids if the cords cannot be visualized.
6. Once inserted, gently advance the Bougie until you meet resistance or "hold-up" (if you do not meet resistance you have a probable esophageal intubation and insertion should be re-attempted or the failed airway protocol implemented as indicated).
7. Withdraw the Bougie ONLY to a depth sufficient to allow loading of the ETT while maintaining proximal control of the Bougie.
8. Gently advance the Bougie and loaded ET tube until you have hold-up again, thereby assuring tracheal placement and minimizing the risk of accidental displacement of the Bougie.
9. While maintaining a firm grasp on the proximal Bougie, introduce the ET tube over the Bougie passing the tube to its appropriate depth.
10. If you are unable to advance the ETT into the trachea and the Bougie and ETT are adequately lubricated, withdraw the ETT slightly and rotate the ETT 90 degrees COUNTER clockwise to turn the bevel of the ETT posteriorly. If this technique fails, to facilitate passing of the ETT you may attempt direct

- laryngoscopy while advancing the ETT (this will require an assistant to maintain the position of the Bougie and, if so desired, advance the ETT).
11. Once the ETT is correctly placed, hold the ET tube securely and remove the Bougie.
 12. Confirm tracheal placement with capnography according to the intubation protocol. inflate the cuff, auscultate for equal breath sounds and reposition accordingly.
 13. When final position is determined secure the ET tube, continuously record and monitor capnography, reassess breath sounds and monitor patient to assure continued tracheal intubation.
 14. If there is any question regarding placement of ETT (**Esophageal vs. Tracheal**) remove immediately and ventilate with bag-valve-mask.

External Cardiac Pacing

Clinical Indications:



- Monitored heart rate less than 60 per minute with signs and symptoms of inadequate cerebral or cardiac perfusion such as:
 - ⇒ Severe chest pain.
 - ⇒ Hypotension.
 - ⇒ Pulmonary edema.
 - ⇒ ALOC, disorientation, confusion, etc.
- PEA, where the underlying rhythm is bradycardic and reversible causes have been treated.

Procedure:

1. Attach standard four-lead monitor.
2. Apply defibrillation/pacing pads to chest and back:
 - One pad to left mid chest next to sternum, one pad to left mid posterior chest next to spine.
3. Rotate selector switch to pacing option.
4. Adjust heart rate to 70 BPM for an adult, 100 BPM for pediatric patients.
5. Note pacemaker spikes on ECG screen.
6. Slowly increase output until capture of electrical rhythm on the monitor.
7. If unable to capture while at maximum current output, stop pacing immediately.
8. If capture observed on monitor, check for corresponding pulse and assess vital signs.
9. **Mechanical capture occurs when paced electrical spikes on monitor correspond with palpable pulse.**
10. Consider the use of sedation or analgesia if patient is uncomfortable.
11. Document the dysrhythmia and the response to external pacing with ECG strips in the Patient Care Report (PCR).

Eye Irrigation



Clinical Indications:

Concern for ocular chemical exposure by either history or physical exam.

Procedure:

1. Identify agent that victim was exposed to.
2. Tilt head forward and brush eyelids/lashes if dry chemical present.
3. Remove contact lenses if present.
4. Instill 1 to 2 drops of Tetracaine into each affected eye; consider repeated instillation of Tetracaine PRN.
5. Prime irrigation tubing after hanging a 1000 ml bag of NSS. Close tubing clamp.
6. Start irrigation with normal saline and continue en route to hospital.

General Airway Management



Clinical Indications:

- Inadequate oxygenation or ventilation
- Unable to remove/relieve obstructing foreign body

Contraindications:

- See specific technique for contraindications to specific procedures

Equipment:

- Bag (appropriate for patient size)
- Bag valve mask or automatic ventilator
- Oxygen source
- Suction device with Yankee
- Oral and Nasal-pharyngeal airways
- King LT airway
- Laryngeal mask airways
- Endotracheal tube (prepare estimated correct size and one size smaller as backup)
- Stylet for endotracheal tube
- Oxygen saturation monitor
- End-tidal CO₂ detection device
 - ⇒ Capnography (waveform)
 - ⇒ Colorimetric device (back-up device)

Procedure:

1. Select and ready equipment, tube sizes, ETCO₂, suction, non-visualized devices (LTA, LMA).
2. If suspicion of trauma, maintain c-spine immobilization
3. Have assistant apply cricoid pressure
4. Suction all debris, secretions from airway
5. Bag valve mask or spontaneous ventilations for 2-5 minutes with 100% oxygen attempting to keep the oxygen saturation > 92%

6. Insert endotracheal tube taking no more than 30 seconds per attempt (see endotracheal intubation technique)
7. If unsuccessful or patient's oxygen saturation drops $\leq 92\%$, bag mask ventilate for additional 2 minutes so that oxygen saturation maintains $> 95\%$
8. If unsuccessful, insert laryngeal tube airway (LTA) or laryngeal mask airway (LMA) following practice parameters.
9. If LMA is an intubating LMA after bagging for 2 minutes, insert endotracheal tube per LMA parameters (if LMA available)
10. If unable to insert LMA or LTA and cannot otherwise ventilate using any of above techniques (including BVM) and unable to maintain oxygen saturation by any other means (BVM, OPA, NPA) at $\geq 90\%$ consider cricothyrotomy per cricothyrotomy parameters.

Laryngeal Mask Airway (LMA)

Clinical Indications:



- Inability to BVM ventilate
- When an alternative airway device is needed in the management of respiratory failure

Contraindications:

- Pharyngeal pathology (abscess or hematoma)
- Obstructive lesions below the glottis
- Limited mouth opening
- Intact gag reflex

Equipment:

- Correctly sized laryngeal mask airway (see chart below)
- Bag valve mask or automatic ventilator
- Oxygen reservoir
- Suction device
- Bite block and/or endotracheal tube holder (if available)
- 25 and/or 35 ml syringes for expanding cuff
- End tidal CO₂ and oxygen saturation monitoring devices

Laryngeal Mask Airway Sizes					
Mask size	Patient weight (kg)	Age (years)	Length (cm)	Cuff volume (ml)	Largest ETT*
1	< 5 kg	< 0.5 yrs	10 cm	4 ml	3.5 mm
1.5	5-10		10	5-7	
2	6.5-20	0.5-5	11.5	7-10	4.5
2.5	20-30	5-10	12.5	14	5.0
3	30-60	10-15	19	15-20	6.0
4	60-80	> 15	19	25-30	6.5
5	> 80	> 15	19	30-40	7.0

* Appropriately sized endotracheal tube (internal diameter) that can be passed through LMA for blind intubation if intubating LMA is inserted.

Procedure – Laryngeal Mask Airway Placement:

- Pre-oxygenate patient with 100% oxygen via bag valve mask to achieve O₂ saturation of >92 % if possible
- Remove the red tag from the balloon port
- Check the integrity of the cuff and pilot balloon
- Tightly deflate the cuff with the syringe
 - ⇒ The deflated cuff should appear BOAT shaped
- Lubricate the posterior surface
- Place patient in neutral sniffing position (if no C-spine/spinal injury suspected)
 - ⇒ For patients with suspected C-spine injury, perform two-person insertion technique:
 - One person maintains manual in-line cervical spine stabilization while the other person proceeds with procedure as below:
- Pull mandible down to open mouth
- Insert uninflated LMA into oral cavity with cuff facing away from hard palate
- Guide LMA around curvature of the posterior pharynx into the hypopharynx until resistance is felt. Resistance is due to the tip of the LMA stopping at the upper esophageal sphincter
- If uninflated LMA insertion is difficult:
 - ⇒ If the curvature of the posterior/hypopharynx is too acute, perform a jaw thrust, pulling the tongue forward. Alternately, a laryngoscope may be used to lift the jaw/mandible to facilitate insertion.
 - ⇒ A slight inflation of the cuff to 1/3 – 1/2 of typical inflation volume may also increase ease of insertion
 - ⇒ Insert LMA with cuff facing hard palate, then rotate 180 degrees into the proper position after the angle around the posterior aspect of the tongue has been cleared.
- Inflate cuff without holding the tube
- Ensure that the black line running the length of the LMA shaft is in the midline of the upper lip and between the two central incisors (this will help maintain a seal)
- Administer gentle positive pressure ventilation
- Obtain end-tidal CO₂ (waveform), listen for breath sounds bilaterally, look for chest excursion, and check oxygen saturation.
- Secure in the midline to help maintain a good seal over the Larynx

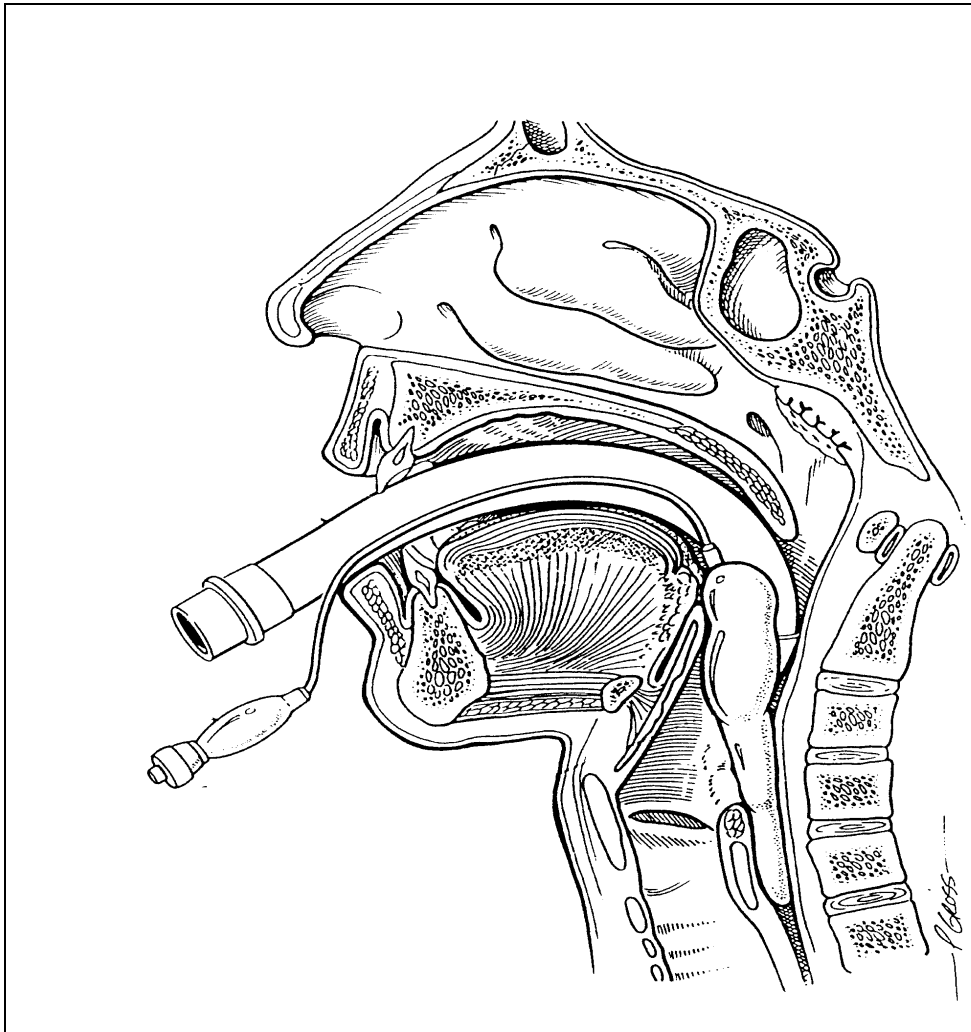
- Place bite block, gauze or endotracheal tube holder (if available) between teeth to prevent biting tube.
- Ensure C-spine is still immobilized
- If repeated attempts are made, oxygenate with 100% O₂ for 2 minutes between attempts

Endotracheal intubation using LMA:

- Select correct size for LMA
- Insert endotracheal tube into oropharynx at 90 angle (from corner of mouth)
- During insertion and passage through the LMA rotate ET tube 90 degrees so that the tip of the ET tube will pass through the bars that traverse the distal opening of the LMA
- Confirm placement as per endotracheal intubation procedural section

(continued on next page)

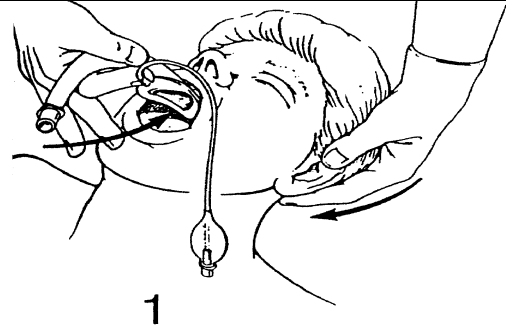
Laryngeal Airway Mask



Laryngeal Mask Airway – The correctly placed LMA lies with the tip resting against the upper esophageal sphincter, the sides against the pyriform fossa and the upper border against the tongue. The opening of the distal end of the LMA should be directly over the glottis (the anterior portion under the epiglottis)

Proper placement for an LMA (Emergency Insertion Technique)

1. Place patient in neutral (sniffing position if no cervical spine injury suspected) and pull down on the mandible to open the mouth. Insert the LMA into the oral cavity and hold it against the hard palate. This also may be performed from the foot of the bed.



2. Press the LMA tube firmly against the hard palate by placing a lubricated finger or thumb just inside the mouth under the tube **(1)**. (see figure) Guide the LMA around the curvature of the posterior pharynx and into the hypopharynx until the characteristic resistance is felt as the tip touches the upper esophageal sphincter. (do not place finger into mouth as shown in this figure. Maintaining firm pressure push tube inwards **(2)** aiming in a cephalad direction so that it slides between the finger and palate until resistance is felt.



3. Inflate the cuff. This will cause the LMA to advance out of the oropharynx by 1-2 cm. Apply gentle positive pressure ventilation and listen for breath sounds. If successful place bite block.

Mucosal Atomizer Device[®]



Purpose:

- Administration of medications via a non-invasive route

Clinical Indications:

- Altered Mental Status, presumed or possible opiate overdose
- Seizures
- Pain management

Contraindications:

DO NOT use on a patient if:

- Severe nasal/facial trauma
- Active nasal bleeding or discharge

Procedure for medication administration via the MAD[®]:

1. Put on protective eyewear, mask, and gloves.
2. Determine appropriate dose of medication per DCALS protocols.
3. Draw medication into syringe and dispose of the sharps (add an additional 0.1 ml of medication due to dead space), do not administer more than 1 ml per nostril.
4. Attach Mucosal Atomizer Device (MAD) to syringe.
5. With one hand, control the patient's head.
6. Gently introduce MAD into nare, stop when resistance is met.
7. Aim slightly upwards and toward the ear on the same side.
8. Briskly compress the syringe to administer one-half of the medication, repeat the procedure with the remaining medication on the other nare.
9. Document the results in the patient care report.

Orogastric Tube Insertion

Clinical Indications:



- Gastric decompression in adult intubated patients
- After successful placement of the LTA

Contraindications:

- History of alkali ingestion, or esophageal disease (e.g. stricture or cancer)
- Comatose state with unprotected airway (as procedure will induce vomiting)
- Penetrating cervical injuries in the awake trauma patient.

Procedure:

1. Estimate insertion length by superimposing the tube over the body from the mouth to the stomach.
2. Lubricate the tube with a water based lubricant prior to insertion.
3. Insert lubricated tube through the gastric port of the LTA or lift tongue/jaw anteriorly while passing tip lateral to endotracheal tube.
4. Continue to advance the tube gently until the appropriate distance is reached.
5. Confirm placement by injecting 20cc of air and auscultate for the swish or bubbling of the air over the stomach. If any doubt about placement, remove and repeat the insertion.
6. Secure the tube.
7. Decompress the stomach of air and food by connecting the tube to low continuous suction.
8. Document the procedure, time, and result (success) on/with the patient care report (PCR).

Laryngeal Tube Airway: LTA (KING LTS-D)

Purpose:

To establish control of the patient's airway and to facilitate ventilation for the listed indications.

	EMT	
P	EMT - P	P

Indications:

- When an alternative airway device is needed in the management of respiratory failure in patients 4 feet tall or greater.

Contraindications:

- Intact gag reflex
- Patients with known esophageal disease
- Patients who have ingested caustic substances
- Patients with known tracheal obstruction
- Patients with a tracheostomy or laryngectomy
- Patients less than 4 feet tall

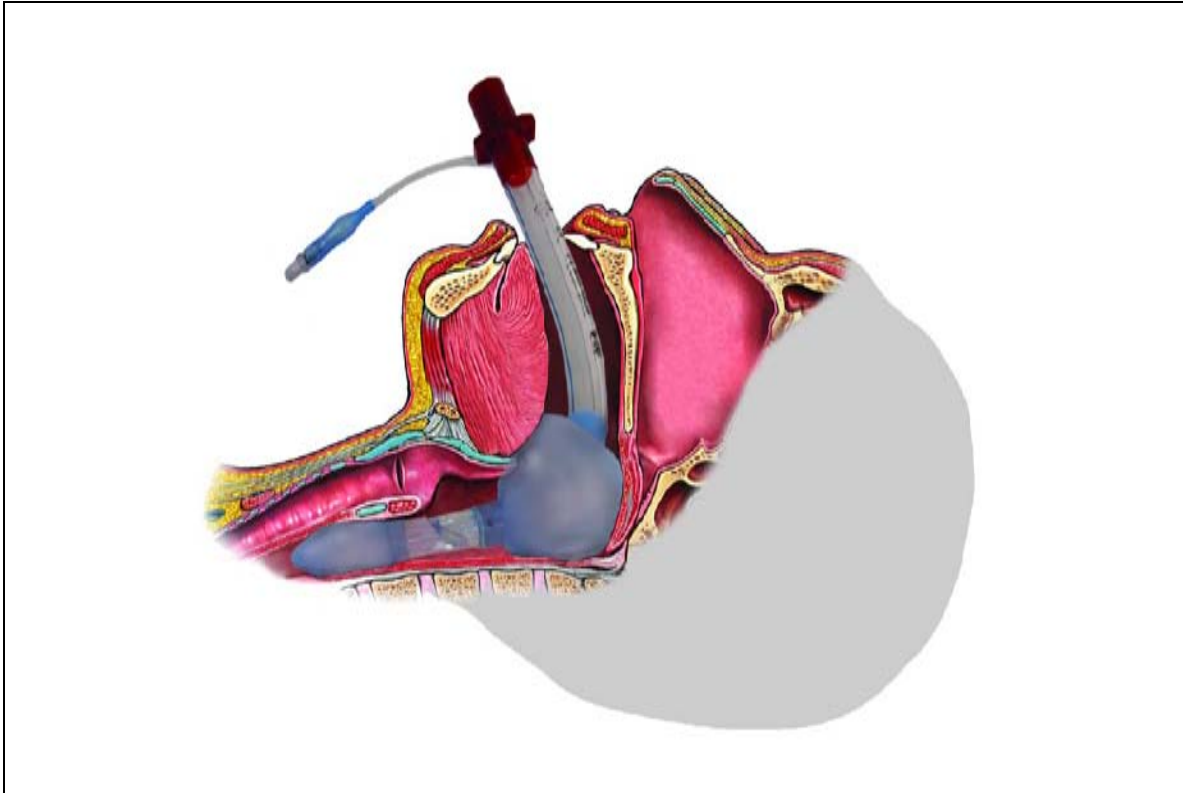
Equipment:

- Correctly sized LTA (see chart below)
- Bag valve mask
- Oxygen reservoir
- Suction device
- Bite block and/or endotracheal tube holder (if available)
- Appropriately sized syringes for expanding cuff
- End tidal CO₂ and oxygen saturation monitoring devices

King LTS-D Airway Sizes					
Airway Size	Connector Color	Patient Height	OD/ID(mm)	Cuff Volume (ml)	Gastric Tube(Fr.)
3	Yellow	4-5 feet	18/10mm	45-60 ml	Up to 18
4	Red	5-6 feet	18/10	60-90	Up to 18
5	Purple	> 6 feet	18/10	70-90	Up to 18

Procedure – LTA Placement:

1. Pre-oxygenate patient with 100% Oxygen via bag valve mask or spontaneous ventilations to achieve O₂ saturation of >95 % if possible
2. Check the integrity of the cuff inflation system and pilot balloon
3. Tightly deflate the cuff with the syringe
4. Lubricate the posterior distal tip of the LTA with a water soluble lubricant
5. Place patient in neutral sniffing position (if no C-spine/spinal injury suspected)
 - ⇒ For patients with suspected C-spine injury, perform two-person insertion technique
 - One person maintains manual in-line cervical spine stabilization while the other person proceeds with procedure as below:
6. Pull mandible down to open mouth
7. Insert uninflated LTA into oral cavity with midline or a lateral technique
8. Advance the tip behind the base of the tongue while rotating tube back to midline so that the blue orientation line faces the chin of the patient.
9. Without exerting excessive force, advance tube until base of the colored connector is aligned with teeth or gums
10. Inflate the KLTD/KLTSD with the appropriate volume:
 - ⇒ If uninflated King Airway insertion is difficult, perform a jaw thrust, pulling the tongue forward. Alternately, a laryngoscope may be used to lift the jaw/mandible to facilitate insertion
11. Attach the resuscitator bag to the King LT.
12. While bagging the patient, gently withdraw the tube until ventilation becomes easy and free flowing (large tidal volume with minimal airway pressure)
13. Adjust cuff inflation if necessary to obtain a seal of the airway at the peak ventilatory pressure employed
14. Obtain end-tidal CO₂ (waveform), listen for breath sounds bilaterally, look for chest excursion, and check oxygen saturation.
15. Secure in the midline to help maintain a good seal over the Larynx
16. Place bite block, oral airway or endotracheal tube holder (if available) between teeth to prevent biting tube.
17. Place orogastric tube and attach to low continuous suction as directed in the applicable procedure to assist in gastric decompression.
18. Ensure C-spine is still immobilized
19. If repeated attempts are made, oxygenate with 100% O₂ for 2 minutes between attempts
20. ****Follow manufacturers suggested guidelines at all times****



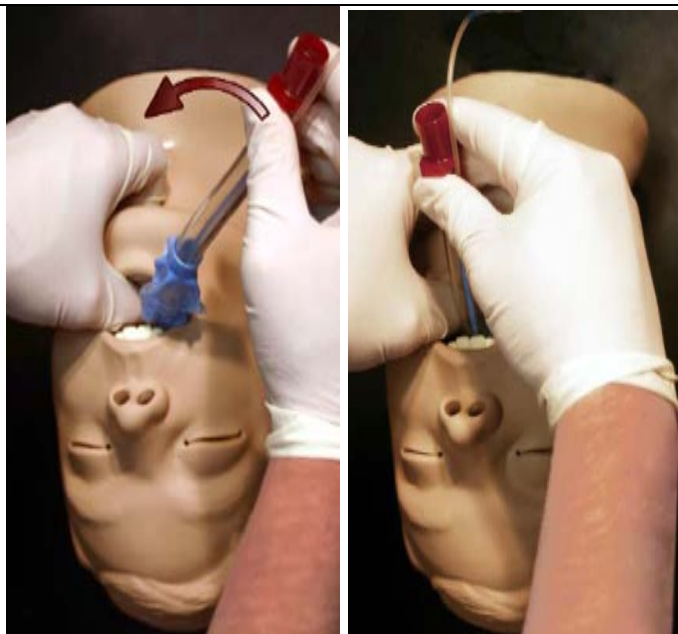
King LT Airway – The correctly placed King LT airway lies with the tip resting in the upper esophagus. The distal cuff inflates in the esophagus, isolating the laryngopharynx from the esophagus. The proximal cuff inflates at the base of the tongue. It isolates laryngopharynx from the oropharynx and the nasopharynx.

Proper placement of a King LT (Emergency Insertion Technique)

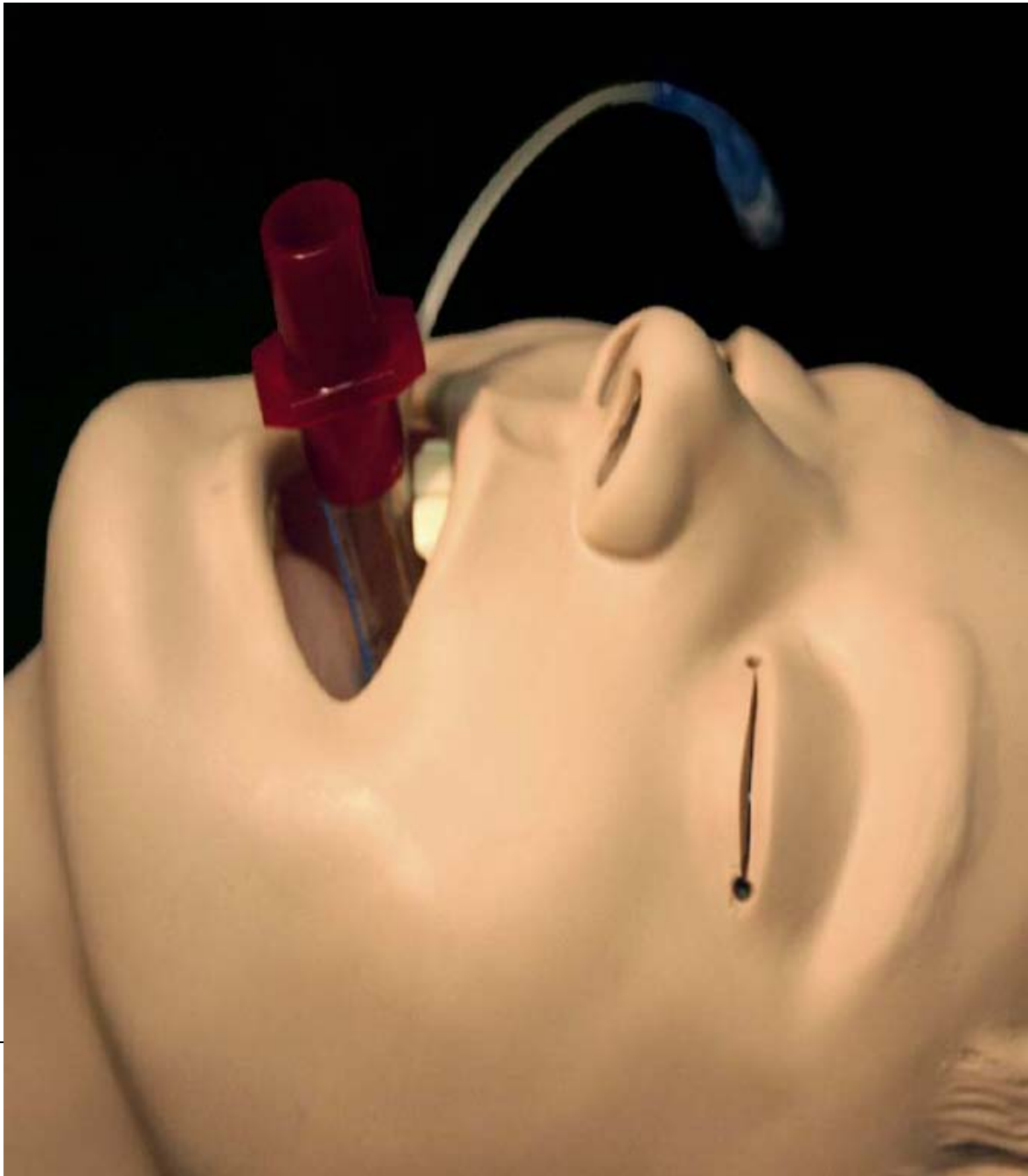
1. Place patient in neutral (sniffing position if no cervical spine injury suspected) and pull down on the mandible to open the mouth. Insert the King LT into the oral cavity from either a midline or lateral approach.



2. Advance the tip of the tube behind the base of the tongue (see figure 1). Then rotate the tube back to the midline so that the blue orientation line faces the chin of the patient (see figure 2).



3. Without exerting excessive force, advance tube until base of connector is aligned with the teeth or gums. Then inflate cuff with appropriate volume.



4. Attach BVM to King LT. While bagging the patient gently withdraw the tube until ventilation becomes easy and free flowing (large tidal volume with minimal airway pressure). Adjust cuff inflation to maintain seal at the peel ventilatory pressure employed.



Pulse Oximetry

Clinical Indications:

	EMT	
P	EMT - P	P

- Patients with suspected hypoxemia, altered level of consciousness or respiratory issues

Procedure:

1. Apply probe to patient's finger or any other digit as recommended by the device manufacturer.
2. Allow machine to register saturation level.
3. Record time and initial saturation percent on room air if possible on/with the patient care report (PCR).
4. Verify pulse rate on machine with actual pulse of the patient.
5. Monitor critical patients continuously until arrival at the hospital. If recording a one-time reading, monitor patients for a few minutes as oxygen saturation can vary.
6. Document percent of oxygen saturation every time vital signs are recorded and in response to therapy to correct hypoxemia.
7. In general, normal saturation is 97-99%. Below 93%, suspect a respiratory compromise.
8. Use the pulse oximetry as an added tool for patient evaluation. Treat the patient, not the data provided by the device.
9. The pulse oximeter reading should never be used to withhold oxygen from a patient in respiratory distress or when it is the standard of care to apply oxygen despite good pulse oximetry readings, such as chest pain.
10. Factors which may reduce the reliability of the pulse oximetry reading include:
 - Poor peripheral circulation (blood volume, hypotension, hypothermia)
 - Excessive pulse oximeter sensor motion
 - Fingernail polish (may be removed with acetone pad)
 - Carbon monoxide bound to hemoglobin
 - Irregular heart rhythms (atrial fibrillation, SVT, etc.)
 - Jaundice
 - Placement of BP cuff on same extremity as pulse ox probe.

Restraints

	EMT	
P	EMT - P	P

Clinical Indications:

- Any patient who may harm himself, herself, or others may be gently restrained to prevent injury to the patient or crew. This restraint must be in a humane manner and used only as a last resort. Other means to prevent injury to the patient or crew must be attempted first. These efforts could include reality orientation, distraction techniques, or other less restrictive therapeutic means. Physical or chemical restraint should be a last resort technique.

Procedure:

1. Attempt less restrictive means of managing the patient.
2. Ensure that there are sufficient personnel available to physically restrain the patient safely.
3. **Restrain the patient in a lateral or supine position. No devices such as backboards, splints, or other devices will be on top of the patient.**
4. **The patient will never be restrained in the prone position.**
5. The patient must be under constant observation by the EMS crew at all times. This includes direct visualization of the patient as well as cardiac, pulse oximetry and capnography monitoring as indicated.
6. The extremities that are restrained will have a circulation check at least every 15 minutes. The first of these checks should occur as soon after placement of the restraints as possible. This **MUST** be documented on the PCR.
7. If the above actions are unsuccessful, or if the patient is resisting the restraints, consider chemical restraint per protocol.
8. If a patient is restrained by law enforcement personnel with handcuffs or other devices EMS personnel cannot remove, a law enforcement officer must accompany the patient to the hospital in the transporting EMS vehicle.
9. Consider excited delirium protocol.
10. **Restraining a patient in the prone position is never authorized.**

Spinal Immobilization of Football Players

	EMT	
P	EMT - P	P

EMS providers must use extreme caution when evaluating and treating an injured football player, especially when the extent of the injury remains unknown. Suspect any unconscious football player has an accompanying spinal injury until proven otherwise. If the football player isn't breathing or the possibility of respiratory arrest exists, it's essential that certified athletic trainers and EMS providers work quickly and effectively to remove the face mask and administer care. ***In most situations, the helmet should not be removed in the field.*** Proper management of head and neck injuries includes leaving the helmet and shoulder pads in place whenever possible, removing only the face mask from the helmet and developing a plan to manage head- and neck-injured football players using well-trained sports medicine and EMS providers.

Guidelines and Recommendations

The following guidelines and recommendations were developed by the Inter-Association Task Force for the Appropriate Care of the Spine-Injured Athlete:

- **General Guidelines for Care Prior to the Arrival of EMS**
 - ⇒ The Emergency Medical Services system should be activated.
 - ⇒ Any athlete suspected of having a spinal injury should not be moved and should be managed as though a spinal injury exists.
 - ⇒ The athlete's airway, breathing and circulation, neurological status and level of consciousness should be assessed.
 - ⇒ The athlete should not be moved unless absolutely essential to maintain airway, breathing and circulation.
 - ⇒ If the athlete must be moved to maintain airway, breathing and circulation, the athlete should be placed in a supine position while maintaining spinal immobilization.
 - ⇒ When moving a suspected spine injured athlete, the head and trunk should be moved as a unit. One accepted technique is to manually splint the head to the trunk.
- **Face Mask Removal**
 - ⇒ ***The face mask should be removed prior to transportation, regardless of current respiratory status. (See Figure 1)***
 - ⇒ ***Those involved in the pre-hospital care of injured football players must have the tools for face mask removal readily available.***

Indications for Football Helmet Removal:

- ***The athletic helmet and chin strap should only be removed if:***
 - ⇒ The helmet and chin strap do not hold the head securely, such that immobilization of the helmet does not also immobilize the head.
 - ⇒ The design of the helmet and chin strap is such that even after removal of the face mask the airway cannot be controlled, or ventilation be provided.
 - ⇒ The face mask cannot be removed after a reasonable period of time.
 - ⇒ The helmet prevents immobilization for transportation in an appropriate position.

Helmet Removal:

- ***If it becomes absolutely necessary, spinal immobilization must be maintained while removing the helmet***
 - ⇒ Helmet removal should be frequently practiced under proper supervision by an EMS supervisor or Field Training Officer.
 - ⇒ Due to the varying types of helmets encountered, the helmet should be removed with close oversight by the team athletic trainers and/or sports medicine staff.
 - ⇒ In most circumstances, it may be helpful to remove cheek padding and/or deflate air padding prior to helmet removal.

Spinal Alignment:

- ***Appropriate spinal alignment must be maintained during care and transport using backboard, straps, tape, head blocks or other necessary equipment.***
 - ⇒ Be aware that the helmet and shoulder pads elevate an athlete's trunk when in the supine position.
 - ⇒ Should either be removed, or if only one is present, appropriate spinal alignment must be maintained.
 - ⇒ The front of the shoulder pads can be opened to allow access for CPR and defibrillation.



Figure 1

Splinting

Clinical Indications:

	EMT	
P	EMT - P	P

- Immobilization of an extremity for transport, either due to suspected fracture, sprain, or injury.
- Immobilization of an extremity for transport to secure medically necessary devices such as intravenous catheters.

Procedure:

1. Assess and document pulses, sensation, and motor function prior to placement of the splint. If no pulses are present and a fracture is suspected, consider reduction of the fracture prior to placement of the splint.
2. Remove all clothing from the extremity.
3. Select a site to secure the splint both proximal and distal to the area of suspected injury, or the area where the medical device will be placed.
4. Do not secure the splint directly over the injury or device.
5. Place the splint and secure with Velcro, straps, or bandage material (e.g., kling, kerlex, cloth bandage, etc.) depending on the splint manufacture and design.
6. Document pulses, sensation, and motor function after placement of the splint. If there has been a deterioration in any of these 3 parameters, reposition the splint and reassess. If no improvement, remove splint.
7. If a femur fracture is suspected and there is no evidence of pelvic fracture or instability, place traction splint.
8. Consider pain management per protocol
9. Document the time, type of splint, and the pre and post assessment of pulse, sensation, and motor function in the patient care report (PCR).

Temperature Measurement

Clinical Indications:

	EMT	
P	EMT - P	P

- Monitoring body temperature in a patient with suspected infection, hypothermia, hyperthermia, or to assist in evaluating resuscitation.

Procedure:

1. If clinically appropriate, allow the patient to reach equilibrium with the surrounding environment.
2. To obtain an oral temperature, ensure the patient has no oral trauma and place the device under the tongue.
3. Leave the device in place until there is indication an accurate temperature has been recorded (per the “beep” or other indicator specific to the device).
4. Record time, temperature, method (tympanic or oral), and scale (C° or F°) in Patient Care Report (PCR).

Guidelines for Transport of Major Trauma Patients to UW ED

Patients with major trauma (one or more of the following) should be transported to UW Hospital:

- Patient unresponsive to voice and /or GCS ≤ 12
- Adult Unstable Vital Signs (BP < 90 mm Hg, HR > 120 or < 60, Respirations < 10 or > 30)
- Pediatric Unstable Vital Signs

	Heart Rate	Systolic BP	Respirations
Less than 1 year	< 90 or > 205	< 60	< 20 or > 80
1 to 5 years	< 70 or > 140	< 70	< 16 or > 30
5 to 12 years	< 60 or > 140	< 80	< 12 or > 30

*** Crying will elevate vital signs. The above values are resting or “calm” guidelines*

- Clinical signs of shock
- Penetrating injuries to head, neck, torso, groin or extremity with signs of distal vascular compromise.
- Flail chest or pelvic fracture
- Burns > 15% TBSA and/or airway involvement
- Two or more proximal long bone fractures (humerus, femur)
- Signs of spinal cord injury
- Amputation injuries proximal to the wrist or ankle
- Significant mechanism of injury in a pregnant patient

CONSIDER transport to UW ER for patients with the following mechanisms of injury and medical conditions:

- Ejection from an automobile during a motor vehicle crash
- Death of another patient in the same auto
- Extrication time of greater than 20 minutes
- Falls:
 - Children > 10 feet (2-3x's patient height)
 - Adults > 20 feet

Guidelines for Transport of Major Trauma Patients, continued

- Victim of a high speed auto crash (impact speed of greater than 40 mph, major auto deformity, intrusion of auto damage into the passenger compartment)
- Auto-pedestrian or auto-bicycle injury with significant impact (> 20 mph)
- Pedestrian thrown or run over
- Motorcycle crash of greater than 20 mph, or separation of rider from bike
- Age of less than 5 or greater than 55 years old
- Patient with cardiac or respiratory disease
- Major trauma patient with immune system problems
- Major trauma patient with bleeding disorder, or currently taking an anticoagulant medication

Note: Above reference is from the Wisconsin Trauma Field Triage Protocol.

Venous Access – Existing Catheters

Clinical Indications:



- Access of an existing venous catheter for medication or fluid administration in a life threatening situation when no other access is available.
- Central venous access in a patient in cardiac arrest.

Contraindications:

- Non-externalized ports (subcutaneous or tunneled ports)

Procedure:

1. Clean the *port* of the catheter with alcohol wipe.
2. Using sterile technique, withdraw 5-10 cc of blood and place syringe in sharps box.
3. Using 5cc of normal saline, access the port with sterile technique and gently attempt to flush the saline.
4. If there is no resistance, no evidence of infiltration (e.g., no subcutaneous, collection of fluid), and no pain experienced by the patient, then proceed to step 5. If there is resistance, evidence of infiltration, pain experienced by the patient, or any concern that the catheter may be clotted or dislodged, do not use the catheter.
5. Begin administration of medications or IV fluids slowly. Observe for any signs of infiltration. If difficulties are encountered, stop the infusion and reassess.
6. Record procedure, any complications, and fluids/medications administered in the Patient Care Report (PCR).

Venous Access – Extremity



Clinical Indications:

- Patients requiring IV medications or fluids
- Patients with any potential for deterioration (e.g. seizures, altered mentation, trauma, chest pain, difficulty breathing)

Contraindications:

- Child with partial airway obstruction (e.g., suspected epiglottitis)– when agitation from performing procedure may worsen respiratory difficulty

Equipment:

- Appropriate tubing or IV lock
- # 14 - #24 catheter over the needle, or butterfly needle
- Venous tourniquet
- Antiseptic swab
- Gauze pad or adhesive bandage
- Tape or other securing device

Procedure

1. Saline locks may be used as an alternative to IV Tubing and fluid at the discretion of the paramedic.
2. Paramedics can use intraosseous access where threat to life exists as provided for in the Venous Access – Intraosseous procedure.
3. Use the largest catheter bore necessary based upon the patient's condition and size of veins.
4. Fluid and setup choice is preferably:
 - Normal Saline with a macro drip (10gtt/cc) for medical/trauma conditions.
 - Normal Saline with a micro drip (60gtt/cc) for medication infusions or for patients where fluid overload is of concern.
5. Assemble IV solution and tubing:
 - Open IV bag and check for clarity, expiration date, etc.
 - Verify correct solution
 - Open IV tubing.
 - Assemble IV tubing according to manufacturer's guidelines

6. Insertion

- Explain to the patient that an IV is going to be started.
- Place the tourniquet around the patient's arm proximal to the IV site, if appropriate
- Palpate veins for resilience.
- Clean the skin with the antiseptic swab in an increasing sized concentric circle and follow it with an alcohol swab.
- Stabilize the vein distally with the Paramedic's thumb/fingers.
- Enter the skin with the bevel of the needle facing upward.
- Enter the vein, obtain a flash, and advance the catheter off of the catheter over the needle and remove the needle while compressing the proximal tip of the catheter to minimize blood loss.
- Remove the tourniquet.
- Connect IV tubing to the catheter, or secure the IV lock to the catheter and flush with appropriate solution (normal saline)
- Open the IV clamp to assure free flow.
- Set IV infusion rate.

7. Secure the IV:

- Secure the IV catheter and tubing.
- Recheck IV drip rate to make sure it is flowing at appropriate rate.
- Troubleshooting the IV, (if the IV is not working well):
- Make sure the tourniquet is off.
- Check the IV insertion site for swelling.
- Check the IV tubing clamp to make sure it is open.
- Check the drip chamber to make sure it is half full.
- Lower the IV bag below IV site and watch for blood to return into the tubing.
- Any patient where intravenous access is indicated (significant trauma or mechanism, emergent or potentially emergent medical condition).

Venous Access – Intraosseous

Clinical Indications:



Patients where rapid, regular IV access is unavailable with any of the following:

- Cardiac Arrest
- CCR – IO is preferable
- Multisystem trauma with **severe** hypovolemia
- Severe dehydration with vascular collapse and/or loss of consciousness
- Respiratory failure/Respiratory arrest

Contraindications:

- Fracture proximal to proposed intraosseous site.
- History of Osteogenesis Imperfecta.
- Current or prior infection at proposed intraosseous site.
- Previous intraosseous insertion or joint replacement at the selected

Procedure:

1. Wear personal protective equipment (gloves, eye protection, etc.)
2. Identify anteromedial aspect of the proximal tibia (bony prominence below the knee cap). The insertion location will be 1-2 cm (2 finger widths) below this.
3. Cleanse the site.
4. For manual pediatric devices, hold the intraosseous needle at a 60 to 90 degree angle, aimed away from the nearby joint and epiphyseal plate, twist the needle handle with a rotating grinding motion applying controlled downward force until a “pop” or “give” is felt indicating loss of resistance. Do not advance the needle any further.
5. For the EZ-IO intraosseous device, hold the intraosseous needle at a 60 to 90 degree angle, aimed away from the nearby joint and epiphyseal plate, power the driver until a “pop” or “give” is felt indicating loss of resistance. Do not advance the needle any further.
6. Remove the stylette and place in an approved sharps container.
7. Attach a 12 cc syringe filled with 5 cc NS; aspirate bone marrow to verify correct placement, then inject 5 cc of NS to clear the lumen of the needle.
8. Attach the IV line. Use a pressure bag.
9. Stabilize and secure the needle with dressings and tape.

~continued~

10. You may administer 10 to 20 mg (1 to 2 cc) of 2% Lidocaine in adult patients who experience infusion-related pain.
11. Following the administration of any IO medications, flush the IO line with 10 cc of IV fluid to expedite medication absorption.
12. Document the procedure, time, and result (success) on/with the patient care report (PCR).

Wound Care

	EMT	
P	EMT - P	P

Clinical Indications:

- Protection and care for open wounds prior to and during transport.

Procedure:

1. Use personal protective equipment, including gloves, gown, and mask as indicated.
2. If active bleeding, elevate the affected area if possible and hold direct pressure. Do not rely on “compression” bandage to control bleeding. Direct pressure is much more effective.
3. Once bleeding is controlled, irrigate contaminated wounds with saline as appropriate (this may have to be avoided if bleeding was difficult to control). Consider analgesia per protocol prior to irrigation.
4. Cover wounds with sterile gauze/dressings. Check distal pulses, sensation, and motor function to ensure the bandage is not too tight.
5. Monitor wounds and/or dressings throughout transport for bleeding.
6. Consider tourniquet use as indicated in DCALS protocols.
7. Document the wound and assessment and care in the patient care report (PCR).

AUTHORIZED PHARMACEUTICALS

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Overview

The purpose of this document is to serve as a drug information supplement and to provide a brief description of the prehospital drugs used. This document in no way represents the comprehensive drug knowledge required for use of these medications by paramedic practitioners. The comprehensive information about use of these medications by practicing paramedics, requires reference to other sources, including, but not limited to, pharmacological textbooks, the DOT curriculum, the Physician's Desk Reference, paramedic text book (e.g. Prehospital Emergency Care, Paramedic Care: Principles and Practice, BTLIS, PHTLS), American Heart Association publications (e.g., ACLS, PALS, NALS), etc.

Drugs are listed alphabetically, based on their generic names (brand names are shown in parenthesis).



Christian C. Zuver, MD, FACEP
Medical Director
Dane County ALS System

Adenosine (Adenocard®)

- **Pharmacologic properties/ action(s):**
 - ⇒ Adenosine is an endogenous purine nucleoside in all cells of the body.
 - ⇒ Adenosine slows conduction time through the AV node, can interrupt the reentry pathways through the AV node and can restore NSR in patients with PSVT
- **Indications:**
 - ⇒ PSVT (rate > 150)
 - ⇒ Wide-complex tachycardia (rate >150), stable and SVT highly likely
- **Contraindications:**
 - ⇒ 2nd or 3rd degree AV block
 - ⇒ Sick sinus syndrome
 - ⇒ Known hypersensitivity
- **Precautions:**
 - ⇒ Effects of Adenosine are antagonized by methylxanthine (theophylline and caffeine), may need to increase dose.
 - ⇒ Adenosine can provoke bronchospasm and should be used cautiously in patients with RAD
 - ⇒ Tegretol and Persantine may potentiate the effect of Adenosine.
 - ⇒ Adenosine is not effective in converting atrial fibrillation or flutter.
 - ⇒ The half-life of adenosine is <5 seconds, and thus requires administration at the port closest to the IV hub.
- **Side effects/ adverse reactions:**
 - ⇒ Cardiovascular- transient chest pain
 - ⇒ Facial flushing (transient)
 - ⇒ Respiratory- transient dyspnea
 - ⇒ Metallic taste
- **Dosage/ administration:**
 - ⇒ **Adult**
 - 12 mg rapid IV bolus over 1-3 seconds. If inadequate response in 1-2 minutes,
 - 12 mg rapid IV bolus over 1-3 seconds.
 - ⇒ **Pediatric**
 - 0.1 mg/kg rapid IV bolus over 1-3 seconds. If inadequate response in 1-2 minutes,
 - 0.2 mg/kg rapid IV bolus, over 1-3 seconds.
 - ◇ maximum individual dose is 12 mg

Albuterol Sulfate (Proventil, Ventolin[®])

- **Pharmacologic properties/ action(s):**
 - ⇒ Albuterol is primarily a beta-2 agonist. It primarily produces bronchodilation, Because of its greater specificity for beta-2 adrenergic receptors, it produces fewer cardiovascular side effects and more prolonged bronchodilation than isoproterenol.
 - ⇒ Onset is within 15 minutes; peaks in 60-90 minutes. Therapeutic effects may be active up to 5 hours.
- **Indications:**
 - ⇒ Acute bronchospasm (wheezing)
 - ⇒ Moderate to severe allergic reaction
 - ⇒ Pediatric allergic reaction/ anaphylaxis
- **Contraindications:**
 - ⇒ Known hypersensitivity
- **Precautions:**
 - ⇒ Use cautiously in patients with coronary artery disease, hypertension, hyperthyroidism, diabetes.
 - ⇒ Epinephrine should not be used at the same time as Albuterol
- **Side effects/ adverse reactions:**
 - ⇒ Central Nervous System
 - Nervousness
 - Tremor
 - ⇒ Cardiovascular
 - Tachycardia
 - Hypertension
 - ⇒ Gastrointestinal
 - Nausea
 - Vomiting
- **Dosage/ administration:**
 - ⇒ Each unit dose delivers 2.5 mg of Albuterol Sulfate 3 ml total solution in adult and pediatric patients.
 - **Adult**
 - ◇ 2.5 mg/3 cc administered via nebulization
 - ◇ repeat as needed
 - **Pediatric**
 - ◇ 2.5 mg/3cc administered via nebulization
 - ◇ repeat to maximum total 3 doses

Amiodarone (Cordarone[®])

- **Pharmacologic action(s):**
 - ⇒ Generally considered a (Vaughan Williams) class III antiarrhythmic
 - ⇒ Possesses electrophysiologic characteristics of all four classes (sodium/ potassium/calcium channel blockade as well as α - and β -adrenergic blocking properties)
 - ⇒ Useful for treatment of atrial (including preexcited arrhythmias) and ventricular arrhythmias
- **Indications:**
 - ⇒ Ventricular Fibrillation/pulseless Ventricular tachycardia
 - ⇒ Ventricular tachycardia, stable and with impaired LV function
 - ⇒ Wide complex tachycardia of unknown etiology
 - ⇒ Pediatric VF/pulseless VT
- **Contraindications:**
 - ⇒ Cardiogenic shock
 - ⇒ Marked sinus bradycardia
 - ⇒ Second or third degree AV block
 - ⇒ Known hypersensitivity to the drug
- **Precautions:**
 - ⇒ Solution is extremely viscous, *Do Not Shake*
 - ⇒ Administer the medication slowly
 - ⇒ Use large bore filtered needles, or needless filter straws
- **Side effects/ adverse reactions:**
 - ⇒ Hypotension
 - ⇒ Bradycardia
 - ⇒ Adverse effects can be treated by the following:
 - Slow the rate of drug infusion
 - IVF bolus, pressors, chronotropic agents, or temporary pacing
- **Dosage/administration:**
 - ⇒ **Adult**
 - Cardiac arrest
 - ◇ 300 mg (undiluted or dilute to 20 cc with D₅W or NS), IV/IO bolus
 - ◇ If administered undiluted, immediately follow with 10-20 cc bolus of NS
 - ◇ 150 mg, IV/IO bolus may be repeated if VF recurs after conversion

Amiodarone (Cordarone®) continued

- Non cardiac arrest
 - ◇ 150 mg (mixed in 100 cc of D₅W), IV over 10 minutes
 - ◇ Repeat 150 mg IV (over 10 min) q 10-15 min prn (max dose of 450 mg)

⇒ **Pediatric**

- Cardiac arrest
 - ◇ 5 mg/kg, IV/IO bolus
- Non cardiac arrest
 - ◇ 5 mg/kg, IV/IO over 20 to 60 minutes

Acetylsalicylic Acid (Aspirin[®])

- **Pharmacologic properties:**
 - ⇒ ASA interferes with platelet aggregation and is known as an antiplatelet medication.
- **Indications:**
 - ⇒ Acute Myocardial Infarction
 - ⇒ Chest Pain/Suspected Myocardial Ischemia/Unstable Angina
- **Contraindications:**
 - ⇒ Known hypersensitivity to this medication
 - ⇒ Active ulcer disease
 - ⇒ Pregnant (especially third trimester) or a nursing mother
 - ⇒ Taking medication for anticoagulation (e.g. coumadin)
- **Side effects:**
 - ⇒ Anaphylaxis (if history of hypersensitivity)
 - ⇒ Abdominal discomfort
 - ⇒ Gastrointestinal bleeding (if previous condition exists)
- **Dosage/ administration:**
 - ⇒ 324 mg PO

Atropine Sulfate (As a Cardiac Agent)

- **Pharmacologic properties/ action(s):**
 - ⇒ Atropine is a potent parasympatholytic anticholinergic.
 - ⇒ It reduces vagal tone, increases automaticity of the SA node and increases AV conduction, thus increasing heart rate.
- **Indications:**
 - ⇒ Bradycardias (rate <60) accompanied by hemodynamic compromise, i.e. hypotension (systolic less than 90 mmHg), shock, pulmonary edema, altered level of consciousness.
 - ⇒ Pediatric Bradycardia (HR <60) despite adequate oxygenation, ventilation, chest compressions, and refractory to epinephrine.
- **Contraindications:**
 - ⇒ Atropine has no effect in patients with transplanted hearts
 - ⇒ 3rd degree AV block in the setting of an acute anterior wall MI.
- **Precautions:**
 - ⇒ Too small a dose (<0.5 mg adults or <0.1 mg pediatrics) or if normal dose pushed too slowly, may initially cause the heart rate to decrease.
 - ⇒ Atropine is potentiated by antihistamines and antidepressants.
 - ⇒ A maximum dose of 0.4 mg/kg should not be exceeded.
 - ⇒ Cautious use in Type II AV block and 3rd degree block with wide QRS complexes.
- **Side effects/ adverse reactions:**
 - ⇒ Central Nervous System
 - Restlessness
 - Agitation
 - Confusion
 - Psychotic reaction
 - Pupil dilation
 - Blurred vision
 - Headache
 - ⇒ Cardiovascular
 - Increase heart rate
 - May worsen ischemia or increase area of infarction.
 - Ventricular fibrillation
 - ⇒ Gastrointestinal
 - Dry mouth
 - Difficulty swallowing
 - ⇒ Genitourinary
 - Urinary retention

Atropine Sulfate (As a Cardiac Agent) continued

- **Dosage/ administration:**

- ⇒ **Adult**

- **Bradydvsrhvthmias:**

- ◇ 0.5 mg IV bolus, repeat every 3 minutes until improved or up to a total of 0.04 mg/kg.

- Shorter dosing intervals may be used in more severe clinical conditions.

- ⇒ **Pediatric**

- **Pediatric Symptomatic Bradycardia:**

- ◇ 0.02 mg/kg IV, IO. This dose may be repeated once in 5 minutes

- Minimum dose is 0.1 mg and maximum single dose is 0.5 mg

Atropine Sulfate (As an Antidote for Poisonings)

- **Pharmacologic properties/ action(s):**
 - ⇒ Atropine is a parasympatholytic.
 - ⇒ Atropine binds to acetylcholine receptors and diminishes the actions of acetylcholine.
- **Indications:**
 - ⇒ Organophosphate Poisoning (i.e. parathion, malathion, rid-a-bug) and carbamate (Baygon, sevin, and many common roach and ant sprays).
 - Poisoning Signs
 - ◇ "SLUDGE"
 - Salivation
 - Lacrimation
 - Urination
 - Defecation
 - GI hypermotility (Emesis, cramping, diarrhea)
 - Excessive sweating and bronchorrhea
 - ◇ Additional Signs
 - Pinpoint pupils
 - Bradycardia
- **Contraindications:**
 - ⇒ None when used in the management of severe organophosphate poisoning.
- **Precautions:**
 - ⇒ It is important that the patient be adequately oxygenated and ventilated prior to using atropine, as atropine may precipitate ventricular fibrillation in a poorly oxygenated patient.
 - ⇒ Do not rely upon pupilloconstriction to discontinue or to titrate medications
- **Side effects/ adverse reactions:**
 - ⇒ Victims of organophosphate poisoning can tolerate large doses (1000 mg) of atropine.
 - Signs of atropinization are likely to occur.
 - ◇ Flushing, pupil dilation, dry mouth, tachycardia.
- **Dosage/ administration:**
 - ⇒ **Adult**
 - 2 mg IV. May repeat 2 mg every 5 minutes
 - ◇ Titrate until respiratory secretions/ distress begins to decrease.

Atropine Sulfate (As an Antidote for Poisonings) continued

⇒ **Pediatric**

- 0.02 mg/kg repeat q 5 minutes as necessary
 - ◇ Titrate until respiratory secretions/ distress begins to decrease.

Calcium Chloride

- **Pharmacologic properties/ action(s):**
 - ⇒ Calcium is a cation.
 - ⇒ Calcium ions increase the force of myocardial contraction and thus act to increase cardiac output. Calcium has a stabilizing effect on cardiac cell membranes when dangerously high potassium levels make the heart at risk for fibrillation.
- **Indications:**
 - ⇒ Hyperkalemia associated with ECG disturbances
 - ⇒ Hypocalcemia (known)
 - ⇒ Calcium channel blocker toxicity with hemodynamic compromise
 - ⇒ Magnesium ($MgSO_4$) toxicity
- **Contraindications:**
 - ⇒ Cardiac arrest not associated with one of the above
- **Precautions:**
 - ⇒ Cautious use in patients receiving digoxin
 - ⇒ Do not mix with Na bicarbonate, it will precipitate.
- **Side effects/ adverse reactions:**
 - ⇒ Bradycardia, usually caused by rapid administration.
 - ⇒ Arrhythmias especially in patients on digoxin.
 - ⇒ Sclerosis of veins (if IV infiltrates)
- **Dosage/ administration:**
 - ⇒ **Adult**
 - 1 amp=1 g (10 cc of a 10% sol'n), IV bolus
 - may repeat X 1 in ten minutes if no response in the setting of a calcium channel blocker overdose.
 - ⇒ **Pediatric**
 - 20 mg/kg slow IV over 2 minutes. Maximum dose 1 g

Dextrose

- **Pharmacologic properties/ action(s)::**
 - ⇒ Dextrose is a monosaccharide.
 - ⇒ It provides calories for metabolic needs, spares body proteins and loss of electrolytes. Readily excreted by kidneys producing diuresis. Hypertonic solution.
- **Indications:**
 - ⇒ Hypoglycemia
 - > 2 months < 70 mg/dl
 - ≤ 2 months < 40 mg/dl
 - ⇒ Coma of unknown origin (altered level of consciousness), and unable to perform glucose check
- **Contraindications:**
 - ⇒ None in the setting of hypoglycemia
- **Precautions:**
 - ⇒ May theoretically precipitate Wernicke-Korsakoff syndrome if given without thiamine in chronic alcohol dependence and malnutrition.
- **Side effects/adverse reactions:**
 - ⇒ Thrombosis, sclerosing if given in a peripheral vein
 - ⇒ Tissue irritation if infiltrates.
 - ⇒ Hyperglycemia
 - ⇒ Hypokalemia
- **Dosage/administration:**
 - ⇒ **Adult**
 - 12.5-25 g IV
 - ⇒ **Pediatric**
 - 4 cc/kg of Dextrose-12.5% solution ≤ 2 months
 - 2 cc/kg of Dextrose-25% solution 2 months-12 y/o

Dextrose Administration Summary Table			
Age	Threshold glucose	Dosage	Dextrose solution
Neonate (≤2 months)	< 40	4 cc/kg	12.5%
2 months-2 YRS	< 70	2cc/kg	25%
Adult	< 70	12.5-25 g	

Diazepam

- **Pharmacologic properties/ action(s):**
 - ⇒ Diazepam is a benzodiazepine family, and as such is a sedative, hypnotic.
 - ⇒ Diazepam depresses the limbic system, thalamus, and hypothalamus resulting in calming effects.
 - ⇒ Diazepam is also a muscle relaxant.
- **Indications:**
 - ⇒ In conjunction with Mark 1 kit or DuoDote kit
 - ⇒ Seizures
- **Contraindications:**
 - ⇒ Acute alcohol intoxication
 - ⇒ Pregnancy, (EXCEPT in eclamptic seizures)
 - ⇒ Respiratory insufficiency
 - ⇒ Hypotension (SBP < 90 mmHg)
 - ⇒ Known hypersensitivity to benzodiazepines
- **Side effects/ adverse reactions:**
 - ⇒ Central Nervous System
 - Confusion, drowsiness
 - Slurred speech
 - Muscular weakness
 - Blurred vision
 - ⇒ Respiratory depression and hypotension (related to rapid IV administration)
- **Dosage/administration:**
 - ⇒ **Adult**
 - Seizures
 - ◇ Per dosing chart
 - Nerve agent WMD
 - ◇ 10 mg IM auto injector
 - ⇒ **Pediatric**
 - Seizures
 - ◇ Per dosing chart

Diltiazem (Cardizem[®])

- **Pharmacologic action(s):**
 - ⇒ Calcium channel blocking agent
 - ⇒ Slows AV nodal conduction
 - ⇒ Increases AV nodal refractoriness
 - Diltiazem inhibits the influx of calcium ions during membrane depolarization of cardiac and vascular smooth muscle, i.e. it slows AV nodal conduction time and prolongs AV nodal refractoriness. Diltiazem slows the ventricular rate in patients with a rapid ventricular response during atrial fibrillation or atrial flutter, converts PSVT to NSR and decreases total peripheral resistance in both SBP and DBP. Diltiazem is a negative inotropic agent (less potent than verapamil) and causes a reduction in myocardial oxygen consumption.
- **Indications:**
 - ⇒ Narrow complex atrial fibrillation/flutter with rapid ventricular rate (>150)
 - ⇒ PSVT refractory to adenosine (**MEDICAL CONTROL ONLY**)
- **Contraindications:**
 - ⇒ Patients with impaired LV function or heart failure
 - ⇒ Complete heart block
 - ⇒ Hypotension (SBP <80), or cardiogenic shock
 - ⇒ Recently (within past 1 hour) received IV β -blocker
 - ⇒ Patients with rapid AF/flutter, with a history of Wolff-Parkinson-White Syndrome (WPW)
 - ⇒ Sick sinus syndrome
 - ⇒ Ventricular tachycardia or wide complex tachycardia
- **Precautions:**
 - ⇒ Cautious use in patients with congestive heart failure, and patients who are already taking antihypertensive medications.
 - ⇒ Monitor closely for signs of developing CHF or hypotension
 - ⇒ Monitor BP closely
- **Side effects/ adverse reactions:**
 - ⇒ Hypotension
 - ⇒ Bradycardia
 - ⇒ Bradycardia
 - ⇒ Heart block

Diltiazem (Cardizem®) continued

- **Dosage/administration:**
 - ⇒ 0.25 mg/kg (20 mg), over 5 minutes
 - ⇒ Repeat 0.35 mg/kg (25 mg), slow IV bolus if no response within 10 minutes and SBP > 100 mmHg.

Diphenhydramine Hydrochloride (Benadryl®)

- **Pharmacologic properties/ action(s):**
 - ⇒ Diphenhydramine is an antihistamine (specifically a histamine H1 receptor antagonist).
 - ⇒ Antihistamines appear to compete with histamine for cell receptor sites on effector cells. Diphenhydramine prevents, but does not reverse histamine-mediated responses, particularly histamine's effects on the smooth muscle of the bronchial airways, gastrointestinal tract, uterus, and blood vessels.
- **Indications:**
 - ⇒ Acute allergic reactions (mild, moderate, or severe)/ Anaphylaxis
 - ⇒ Acute dystonic reactions
 - *[associated with ingestion of and or overdose of phenothiazines and related drugs (haloperidol, thiorazine, compazine, stelazine, metaclopramide (Reglan))].*
- **Contraindications:**
 - ⇒ Benadryl is not to be used in newborn or premature infants or in nursing mothers.
 - ⇒ Known hypersensitivity to diphenhydramine or antihistamines.
- **Precautions:**
 - ⇒ In infants and children especially, antihistamines in over-dosage may cause hallucinations, convulsions, or death.
 - ⇒ As in adults, antihistamines may diminish alertness in children. In young children, they may produce excitation.
 - ⇒ Benadryl has additive effects with alcohol and other CNS depressants (hypnotics, sedatives, tranquilizers, etc).
 - ⇒ Antihistamines are more likely to cause dizziness, sedation and hypotension in the elderly (60 years or older) patient.
 - ⇒ Diphenhydramine hydrochloride has an atropine-like action and therefore should be used with caution in patients with a history of bronchial asthma, increased intraocular pressure, hyper-thyroidism, cardiovascular disease or hyper-tension.
 - ⇒ Use with caution in patients with lower Respiratory disease, including asthma.
- **Side effects/ adverse reactions:**
 - ⇒ Central Nervous System (Especially in the elderly)
 - Drowsiness, sedation
 - Confusion

Diphenhydramine Hydrochloride (Benadryl®) continued

- Insomnia
- Headache
- Vertigo
- Hyperactivity in children
- ⇒ Cardiovascular
 - Palpitations
 - Tachycardiac
 - PVC's
 - Hypotension
- ⇒ Gastrointestinal
 - Nausea
 - Vomiting
 - Diarrhea
 - Dry mouth
 - Constipation
- ⇒ Genitourinary
 - Dysuria
 - Urinary retention
- ⇒ Respiratory
 - Thickening of bronchial secretion
 - Tightness of the chest
 - Wheezing
 - Nasal stuffiness
- **Dosage/ administration:**
 - ⇒ **Adults**
 - 50 mg IV or IM
 - 25 mg IV bolus for acute dystonic reaction, may repeat in 10 minutes if no response
 - ⇒ **Pediatrics**
 - 1 mg/kg IV or IM. Single maximum dose is 50 mg.
 - Single dose of 25 mg in acute dystonic reaction.

Dopamine Hydrochloride (Intropin[®])

- **Pharmacologic properties/ action(s):**
 - ⇒ Dopamine is a catecholamine.
 - ⇒ Dopamine stimulates dopaminergic, beta-adrenergic and alpha-adrenergic receptors of the nervous system. It exerts an inotropic effect on the myocardium resulting in an increased cardiac output. Dopamine produces less increase in myocardial oxygen consumption than does isoproterenol and its use is usually not associated with a tachyarrhythmia. Dopamine dilates renal and mesenteric blood vessels at low doses (1-2 mg/kg/mm) that may not increase heart rate or blood pressure.
 - ⇒ Therapeutic doses (2-10 mg/kg/mm) have predominant beta-adrenergic receptor stimulating actions that result in increases in cardiac output without marked increases in pulmonary occlusive pressure.
 - ⇒ At high doses (>10 mg/kg/mm) Dopamine has alpha receptor stimulating actions that result in peripheral vasoconstriction and marked increases in pulmonary occlusive pressure.
- **Indications:**
 - ⇒ Cardiogenic, neurogenic, septic, or anaphylactic shock.
 - ⇒ Bradycardia with hypotension refractory to Atropine and TCP
 - ⇒ Hemodynamically significant (SBP < 90 mm Hg) overdose
 - ⇒ Hypotension (SBP < 90 mm Hg), *i.e., not secondary to hypovolemia*
- **Contraindications:**
 - ⇒ Dopamine should not be used in patients with pheochromocytoma.
 - ⇒ Shock due to hypovolemia.
- **Precautions:**
 - ⇒ Do not administer Dopamine in the presence of uncorrected tachyarrhythmias or ventricular fibrillation. Do not add Dopamine to any alkaline diluent solution since the drug is inactivated in alkaline solution.
 - ⇒ Patients who have been treated with monoamine oxidase (MAO) inhibitors will require substantially reduced dosage.
- **Side effects/ adverse reactions:**
 - ⇒ Central Nervous System
 - Headache
 - ⇒ Cardiovascular
 - Ectopic beats
 - Tachycardia
 - Anginal Pain
 - Palpitation

Dopamine Hydrochloride (Intropin®) continued

- Hypotension
- ⇒ Gastrointestinal
 - Nausea
 - Vomiting
- ⇒ Local
 - Necrosis and tissue sloughing with extravasation
- ⇒ Other
 - Piloerection
 - Dyspnea
- **Dosage/ administration:**
 - ⇒ 5 - 20 mcg/kg/min titrated as needed if SBP < 90 mm Hg
 - Mix 400 mg of Dopamine in 500ml of NS to yield a concentration of 800 mcg/ml, or in 250 cc NS to yield a concentration of 1600 mcg/ml.

DuoDote Kit

◆ See Mark 1 Kit

Epinephrine Hydrochloride (1:1,000)

- **Pharmacologic properties/ action(s):**
 - ⇒ Epinephrine hydrochloride stimulates Alpha and Beta receptors.
 - ⇒ Effects include bronchodilation, increase in heart rate, increase in contractility, and increase in systemic vascular resistance.
- **Indications:**
 - ⇒ Bronchospasm (wheezing) associated with Asthma or COPD exacerbation
 - ⇒ Acute allergic reaction associated with *Severe systemic reaction (BP < 90, stridor, severe respiratory distress)*/Anaphylaxis in adults and pediatrics
 - ⇒ Cardiac arrest in adults and pediatrics.
- **Contraindications:**
 - ⇒ Cautious use in the following circumstances:
 - Presence of hypertension
 - History of heart disease
 - Age over 50 years
- **Precautions:**
 - ⇒ Epinephrine is inactivated by alkaline solutions.
 - NEVER mix with Sodium Bicarbonate.
 - ⇒ 1:1,000 cannot be given intravenously in patients with a pulse.
- **Side effects/ adverse reactions:**
 - ⇒ Central Nervous System
 - Anxiety
 - Headache
 - Cerebral hemorrhage
 - ⇒ Cardiovascular
 - Tachycardia
 - Ventricular dysrhythmias
 - HTN
 - Angina
 - ⇒ Gastrointestinal
 - Nausea and vomiting
- **Dosage/ administration:**
 - ⇒ **Adult**
 - 0.3 mg IM (prior permission from medical control if Age > 50, HR > 150, history of heart disease)
 - ⇒ **Pediatric**
 - Bronchospasm / Acute allergic reaction
 - ◇ 0.01 mg/kg (max 0.3 mg) IM

Epinephrine Hydrochloride (1:1,000) continued

- May repeat every 15 minutes as needed X 2 additional doses (3 total)
- May administer at same time nebulizer is being administered

Epinephrine Hydrochloride (1:10,000)

- **Pharmacologic properties/ action(s):**
 - ⇒ Epinephrine is a sympathomimetic which stimulates both Alpha and Beta receptors
 - ⇒ Its effects are to increase systemic vascular resistance, arterial blood pressure, coronary and cerebral blood flow, heart rate and contractility, and myocardial oxygen requirements.
 - ⇒ The alpha-adrenergic effect is to increase SVR and coronary blood flow (makes the fibrillating myocardium more susceptible to counter-shock).
- **Indications:**
 - ⇒ Ventricular fibrillation or pulseless ventricular tachycardia
 - ⇒ Asystole
 - ⇒ Pulseless electrical activity (PEA)
 - ⇒ Anaphylactic shock
 - ⇒ Newborn resuscitation/Neonatal asystole or bradycardia
 - ⇒ Pediatric bradycardia/Pulseless cardiac arrest/VF/pulseless VT
 - ⇒ Bradycardia with hypotension refractory to atropine and TCP
- **Contraindications:**
 - ⇒ **NONE** in the cardiac arrest situation
- **Precautions:**
 - ⇒ Epinephrine is inactivated by alkaline solutions. NEVER mix with Sodium Bicarbonate.
- **Side effects/ adverse reactions:**
 - ⇒ Central Nervous System
 - Anxiety
 - Headache
 - Cerebral hemorrhage
 - ⇒ Cardiovascular
 - Tachycardia
 - Ventricular dysrhythmias
 - HTN
 - Angina
 - ⇒ Gastrointestinal
 - Nausea
 - Vomiting

Epinephrine Hydrochloride (1:10,000) continued

- **Dosage/ administration:**

- ⇒ **Adult**

- Cardiac arrest
 - ◇ IV/IO: 1 mg (10 cc)
 - Repeat every 3-5 minutes at the same dose
 - Bradycardia (with serious signs and symptoms)
 - ◇ Continuous IV infusion: set rate at 2-10 mcg/min, titrate to affect
 - Allergic reaction (Cardiac Arrest or Respiratory arrest Imminent)
 - ◇ 0.5 mg (5cc of 1:10,000) IVP

- ⇒ **Pediatric**

- Pulseless cardiac arrest / Ventricular fibrillation/pulseless VT
 - ◇ 0.01 mg/kg, (max 1.0 mg) IV or IO
 - ◇ Repeat every 3-5 minutes at the same dose
 - Newborn resuscitation
 - ◇ 0.01 mg/kg IV of a 1:10,000 solution
 - ◇ repeat every 3 to 5 minutes as indicated
 - Bradycardia with cardiopulmonary compromise
 - ◇ 0.01 mg/kg (max 1 mg) via IV/IO
 - ◇ Use first route available
 - ◇ Repeat dose every 3-5 minutes until either the bradycardia or severe cardiopulmonary compromise resolves

*******ALSO SEE EPINEPHRINE DOSING SUMMARY *******

Adult Epinephrine Dosing Summary

- **Cardiac arrest:** (for V-fib, pulseless V-tach, asystole, or PEA only)
 - ⇒ Standard: 1 mg (1:10,000) IV/IO bolus every 3-5 minutes
- **For Anaphylactic Shock:**
 - ⇒ 0.5 mg (1:10,000) IV/IO bolus.
- **For bradycardia with hypotension refractory to Atropine and TCP:**
 - ⇒ Continuous IV infusion: mix 2 mg (1:1,000) in 250 cc NS (8 mcg/cc) and run at 2-10 mcg/min
 - Every 15 gtts/min = 2 mcg/min.

Pediatric Epinephrine Dosing Summary

- **Newborn resuscitation:**
 - ⇒ 0.01 mg/kg IV/IO of a 1:10,000 solution
 - ⇒ repeat every 3 to 5 minutes as indicated
- **Bradycardia with cardiopulmonary compromise:**
 - ⇒ 0.01 mg/kg IV/IO (1:10,000) max 1 mg
 - ⇒ Use first route available
 - ⇒ Repeat dose every 3-5 minutes until either the bradycardia or severe cardiopulmonary compromise resolves
- **Pulseless cardiac arrest / Ventricular fibrillation/pulseless VT:**
 - ⇒ 0.01 mg/kg IV/IO (1:10,000) max 1 mg
 - ⇒ Use first route available
 - ⇒ Repeat every 3-5 minutes at the same dose

Etomidate

- **Pharmacologic properties:**
 - ⇒ Non-barbiturate hypnotic
 - ⇒ Depresses cerebral metabolism
 - ⇒ Lacks analgesic activity
- **Indications:**
 - ⇒ Induction agent for RSA
- **Contraindications:**
 - ⇒ Hypersensitivity
 - ⇒ Possibly sepsis/septic shock
- **Precautions/side effects:**
 - ⇒ Depresses the respiratory drive producing apnea, requiring ventilation
 - ⇒ Hypotension
 - ⇒ Adrenal Suppression
 - ⇒ Myoclonic jerks (mimics seizures)
 - ⇒ Pain at injection site
- **Dosage/administration:**
 - ⇒ **Adults**
 - 0.3 mg/kg IV/IO, maximum dose 20 mg

Famotidine (Pepcid[®])

- **Pharmacologic properties/ action(s):**
 - ⇒ Histamine H₂ -receptor antagonist
 - ⇒ Famotidine (Pepcid) competitively inhibits the action of histamine at the histamine H₂-receptors. This antihistamine property functions to inhibit gastric acid secretion, and to inhibit the action of histamine from contributing to anaphylactoid reactions and/or anaphylaxis.
- **Indications:**
 - ⇒ Allergic/ Anaphylactic Reactions in adult and pediatric patients
 - Famotidine is indicated even in the presence of hypotension.
- **Contraindications:**
 - ⇒ Known hypersensitivity
- **Precautions/ side effects:**
 - ⇒ Rare instances of arrhythmias and hypotension have been reported following rapid IV bolus.
- **Dosage/ administration:**
 - ⇒ **Adult**
 - 20 mg in 100 ml D5W Intravenous Piggyback (IVPB) over 15minutes
 - ⇒ **Pediatric**
 - 0.5 mg/kg (maximum 20 mg) in 100 ml D5W Intravenous Piggyback (IVPB) over 15minutes **(MEDICAL CONTROL OPTION ONLY)**

Fentanyl

- **Pharmacologic properties:**
 - ⇒ Synthetic narcotic (opioid) analgesic
 - ⇒ It depresses the central nervous system and suppresses pain via binding at opioid receptors of the brain.
- **Indications:**
 - ⇒ Chest Pain associated with suspected myocardial ischemia
 - ⇒ Thermal burns
 - ⇒ Isolated extremity injury
 - ⇒ Premedication for cardioversion, or transcutaneous pacing
- **Contraindications:**
 - ⇒ Hypotension, (SBP <100 mmHg), or volume depletion
 - ⇒ Head trauma
 - ⇒ Acute alcohol intoxication
 - ⇒ Known hypersensitivity
- **Precautions/side effects:**
 - ⇒ It is potentiated by alcohol, antihistamines, barbiturates, phenothiazines, and other sedatives.
 - ⇒ Central Nervous System
 - Euphoria
 - Drowsiness
 - Pupillary constriction
 - Respiratory arrest
 - ⇒ Cardiovascular
 - Bradycardia
 - Hypotension
 - ⇒ Gastrointestinal
 - Decreases gastric motility
 - Nausea and vomiting
 - ⇒ Genitourinary
 - Urinary retention
 - ⇒ Respiratory
 - Decrease cough reflex
- **Dosage/administration:**
 - ⇒ **Adult**
 - Procedural Sedation
 - ◇ 25-50 mcg IV/IO titrated to a maximum of 200 mcg.
 - Pain management

Fentanyl, continued

- ◇ 25-50 mcg IV/IO every 5 minutes, titrated to a maximum dose of 200 mcg
 - Chest Pain (Cardiac)
 - ◇ 25-50 mcg IV/IO every 2 minutes, titrated to a maximum dose of 200 mcg.
- ⇒ **Pediatric**
- Pain management
 - ◇ 1.5 mcg/kg IN, maximum dose 100 mcg.

Glucagon

- **Pharmacologic properties/ action(s):**
 - ⇒ Glucagon is a hormone.
 - ⇒ Glucagon, produced in the pancreas by the Alpha cells of the Islets of Langerhans, causes an increase in blood glucose concentrations. It is effective in small doses and no evidence of toxicity has been reported with its use. Glucagon acts only on liver glycogen, converting it to glucose.
 - ⇒ Glucagon effectively restores inotropy and chronotropy, via a cyclic-AMP mechanism, in patients with cardio-vascular toxicity secondary to beta-blockers, and to a more variable degree, to calcium channel blockers.
- **Indications:**
 - ⇒ Hypoglycemia (where IV access cannot be obtained).
 - ⇒ Beta-blocker and calcium channel blocker overdoses.
- **Contradictions:**
 - ⇒ Since glucagon is a protein, hypersensitivity is a possibility.
- **Precautions:**
 - ⇒ Glucagon should be administered with caution in patients with a history of insulinoma and/or pheochromocytoma.
- **Side effects/ adverse reactions:**
 - ⇒ Gastrointestinal
 - ⇒ Occasional nausea and vomiting
- **Dosage/ administration:**
 - ⇒ **Adult**
 - Hypoglycemia
 - ◇ 1.0 unit (1.0 mg) of Glucagon, IM.
 - Beta-blocker (or calcium channel blocker)
 - ◇ 3.0 mg IV bolus.
 - ⇒ **Pediatric**
 - 0.1 mg/kg (max 1.0 mg), IV/IM

Glucose (Oral)

- **Pharmacologic properties:**
- Glucose is a monosaccharide.
 - ⇒ It provides calories for metabolic needs, spares body proteins and loss of electrolytes.
- **Indications:**
 - ⇒ Hypoglycemia
- **Contraindications:**
 - ⇒ Inability to self administer due to altered level of consciousness
- **Precautions/side effects:**
 - ⇒ Aspiration risk in patients with altered level of consciousness
- **Dosage/administration:**
 - ⇒ **Adult**
 - If Hypoglycemic (Blood glucose < 70 mg/dL) without IV access. Glucose paste 15 g or other oral glucose containing agent (e.g., orange juice) if patient alert enough to self administer oral agent

Haloperidol (Haldol®)

- **Pharmacologic properties/ action(s):**
 - ⇒ Antipsychotic agent or major tranquilizer (of the butyrophenone class).
 - ⇒ May block dopamine receptors in CNS, but exact mechanism has not been clearly established. It acts to have a profound calming effect on patients.
- **Indications:**
 - ⇒ Behavioral emergencies for patients with severe agitation or aggressive behavior resulting in interference with patient care or patient/crew safety.
- **Contraindications:**
 - ⇒ Not to be administered to patients on MAO inhibitors
 - ⇒ Known hypersensitivity
- **Precautions:**
 - ⇒ Haldol should be administered cautiously to patients with a history of cardiovascular disorders, seizures, anticoagulant therapy.
 - ⇒ If hypotension occurs, do not use epinephrine as its vasopressor action is blocked and blood pressure may drop even further.
 - ⇒ If acute laryngospasm occurs, immediately administer diphenhydramine (benadryl) 50 mg IV bolus.
- **Side effects/ adverse reactions:**
 - ⇒ Central Nervous System
 - Parkinson-like symptoms, i.e. Extrapyramidal symptoms characterized by dystonic reactions.
 - ⇒ Cardiovascular
 - Tachycardia
 - Hypotension
 - Hypertension
 - EKG changes
 - ⇒ Respiratory
 - Laryngospasm
 - Bronchospasm
- Respiratory depression
 - ⇒ Gastrointestinal
 - Nausea and vomiting
 - Anorexia
- **Dosage/ administration:**
 - ⇒ **Adult**
 - 5 mg if < 60 kg IM (standing)

Haloperidol (Haldol®) continued

- 10 mg if > 60 kg IM (standing)
 - ◇ If inadequate response, call medical control for repeat dosing
- ⇒ **Pediatric**
- Safety and effectiveness in children has not been conducted.

Hydroxycobalamin (Cyanokit®)

- **Pharmacologic properties:**
 - ⇒ Hydroxycobalamin is a precursor element.
 - ⇒ The action of hydroxycobalamin in the treatment of Cyanide poisoning is based on its ability to bind cyanide ions. Each hydroxocobalamin molecule can bind one cyanide ion by substituting it for the hydroxo ligand linked to the trivalent cobalt ion, to form cyanocobalamin, which is then excreted in the urine.
- **Indications:**
 - ⇒ Treatment for known or suspected cyanide poisoning
- **Contraindications:**
 - ⇒ None in the setting of known or suspected cyanide poisoning
- **Precautions/side effects:**
 - ⇒ Increased blood pressure
 - ⇒ Allergic reaction
 - ⇒ Skin and subcutaneous tissue disorders: urticaria, pruritus
 - ⇒ Vascular disorders: hot, flush
- **Dosage/administration:**
 - ⇒ 5 g IV/IO over 15 minutes

Ipratropium Bromide (Atrovent®)

- **Pharmacologic action:**
 - ⇒ An anticholinergic bronchodilator classified as a quaternary ammonium compound. Anticholinergics prevent the increases in intracellular cyclic guanosine monophosphate (cGMP) which are caused by interaction of acetylcholine with the muscarinic receptor on bronchial smooth muscle.
 - ⇒ The bronchodilating effect of ipratropium is primarily local and site specific.
 - ⇒ It is not well absorbed systemically, resulting in low potential for toxicity.
 - ⇒ Half-life of elimination is about 2 hours after inhalation.
- **Indications:**
 - ⇒ Acute bronchospasm (wheezing) associated with asthma or COPD
 - ⇒ Acute bronchospasm (wheezing) in adult and pediatric patients
- **Contraindications:**
 - ⇒ Hypersensitivity to atropine or its derivatives or to soya lecithin or related food products such as soybean or lecithin
- **Precautions:**
 - ⇒ Use with caution in patients with narrow angle glaucoma, prostatic hypertrophy, or bladder-neck obstruction
- **Side effects/ adverse reactions:**
 - ⇒ Palpitations
 - ⇒ Nervousness
 - ⇒ Dizziness
 - ⇒ Headache
 - ⇒ Nausea
 - ⇒ GI distress
 - ⇒ Dry mouth
 - ⇒ Cough
- **Dosage/administration:**
 - ⇒ **Adult**
 - 0.5 mg/2.5 ml via nebulizer
 - ◇ Combined with Albuterol on initial nebulized treatment
 - ⇒ **Pediatric**
 - 0.5 mg/2.5 ml via nebulizer
 - ◇ Combined with Albuterol on initial nebulized treatment

Ketamine

- **Pharmacologic properties:**
 - ⇒ Ketamine is a non barbiturate anesthetic
 - ⇒ It produces dissociative anesthesia
 - ⇒ Rapid onset of action
- **Indications:**
 - ⇒ Medical control option for Excited Delirium when patient is a threat to crew or self.
- **Contraindications:**
 - ⇒ Uncontrolled hypertension
 - ⇒ Known hypersensitivity
- **Precautions/side effects:**
 - ⇒ Hypertension, tachycardia, laryngeal spasm, muscle rigidity
 - ⇒ Only to be used in a setting where a trained provider capable of endotracheal intubation/advanced airway placement. Resuscitation medication and equipment must be readily available.
- **Dosage/administration:**
 - ⇒ 4 mg/kg IM **MEDICAL CONTROL OPTION ONLY**

Lidocaine Hydrochloride (Xylocaine[®])

- **Pharmacologic properties/ action(s):**
 - ⇒ Lidocaine is a class Ib antiarrhythmic agent.
 - ⇒ Lidocaine also blunts the rise in intracranial pressure resulting from laryngoscopy.
- **Indications:**
 - ⇒ Pretreatment for Rapid Sequence Airway Management (RSA) in patients with suspected closed head injury.
- **Contraindications:**
 - ⇒ Lidocaine is contraindicated in second-degree heart block, Mobitz II, complete A-V block; and Stokes-Adams syndrome.
- **Side effects/ adverse reactions:**
 - ⇒ Central Nervous System
 - Drowsiness
 - Numbness
 - Dizziness
 - Blurred vision
 - Convulsions
 - Tremors
 - ⇒ Cardiovascular
 - Widening of QRS complexes
 - Bradycardia
 - Cardiac arrest
 - ⇒ Respiratory
 - At toxic levels – respiratory depression and/or respiratory arrest
- **Dosage/ administration:**
 - ⇒ **Adult**
 - Pretreatment for RSA in the setting of closed head injury
 - ◇ 1.5 mg/kg IV/IO

Lorazepam (Ativan[®])

- **Pharmacologic properties/ action(s):**
 - ⇒ Lorazepam is a benzodiazepine family, and as such is a sedative, hypnotic.
 - ⇒ Lorazepam depresses the limbic system, thalamus, and hypothalamus resulting in calming effects.
 - ⇒ Lorazepam produces an amnesic effect and is also a muscle relaxant.
- **Indications:**
 - ⇒ Status epilepticus
 - ⇒ Cocaine (sympathomimetic) toxicity
 - ⇒ Behavioral emergencies in patients with severe agitation or aggressive behavior resulting in interference with patient care or patient/crew safety
 - May be adjunctive treatment, with haloperidol
- **Contraindications:**
 - ⇒ Acute alcohol intoxication
 - ⇒ Pregnancy, (EXCEPT in eclamptic seizures)
 - ⇒ Respiratory insufficiency
 - ⇒ Hypotension (SBP < 90 mmHg)
 - ⇒ Known hypersensitivity to benzodiazepines
- **Side effects/ adverse reactions:**
 - ⇒ Central Nervous System
 - Confusion, drowsiness
 - Slurred speech
 - Muscular weakness
 - Blurred vision
 - ⇒ Respiratory depression and hypotension (related to rapid IV administration)
- **Dosage/administration:**
 - ⇒ **Adult**
 - 1-2 mg, IV or IM. IV route should be administered slowly – rate not to exceed 1 mg/min
 - May be repeated
 - ⇒ **Pediatric**
 - 0.05 mg/kg, IV or IM (maximum single dose 2mg) IV route should be administered slowly – rate not to exceed 0.5 mg/min.
 - May be repeated

Magnesium Sulfate

- **Pharmacologic properties/ action(s):**
 - ⇒ Magnesium is a cation that is more than 98% contained within the intracellular compartment.
 - ⇒ Magnesium is a cofactor of membrane Na-K-ATP-ase (Na out, K in), and as such plays an integral role in maintaining intracellular potassium levels. Magnesium is essential for energy transfer and electrical stability. Magnesium also appears to be an outstanding antiarrhythmic, and it has been demonstrated that prophylactic administration of Magnesium Sulfate significantly reduces the incidence of potentially lethal ventricular arrhythmias in patients with AMI. It is also a CNS depressant effective in the management of seizures associated with toxemia of pregnancy (eclampsia).
- **Indications:**
 - ⇒ Cardiac Arrest associated with suspected hypomagnesemic state
 - ⇒ Torsades de Pointes
 - ⇒ Eclampsia
 - ⇒ Known hypomagnesemia associated with arrhythmias
 - ⇒ Severe respiratory distress in the setting of severe bronchospasm refractory to other treatments
- **Contraindications:**
 - ⇒ Renal Failure
- **Precautions:**
 - ⇒ Avoid rapid IVP unless unstable
 - ⇒ Calcium Chloride as antidote to respiratory depression.
- **Side effects/ adverse reactions:**
 - ⇒ Loss of DTR's
 - ⇒ Respiratory arrest
 - ⇒ Hypotension
 - Treat with 10% calcium chloride, 5-10 cc, IV bolus
 - ⇒ Drowsiness
 - ⇒ Flushing
- **Dosage/ administration:**
 - ⇒ **Adult**
 - For cardiac arrest:
 - ◇ 2 g, IV/IO bolus over 1-2 minutes.
 - For torsades de pointes:
 - ◇ 2 g IV/IO over 1-2 minutes

Magnesium Sulfate, continued

- For eclampsia:
 - ◇ 4 g in 100 ml D5W IV over 10 minutes
 - contraindicated if renal failure
 - For severe respiratory distress (bronchospasm)
 - ◇ 2 g IV in 100 ml D5W IV over 10 minutes
 - contraindicated if renal failure
- ⇒ **Pediatric**
- 50 mg/kg in 100 ml D5W IV over 5-10 minutes

Mark 1 Kit

- **Pharmacologic properties:**
 - ⇒ Atropine and Pralidoxime Autoinjector
 - Atropine-Potent anti-secretory effects caused by the blocking of acetylcholine at the muscarinic site
 - Pralidoxime-Organophosphates inhibit cholinesterase by phosphorylation of the enzyme. Pralidoxime reactivates the cholinesterase by removing the phosphoryl group that is bound to the ester group. In this reaction both the organophosphate and the pralidoxime are mutually inactivated. These products undergo rapid metabolism, leading to the removal of the organophosphate.
- **Indications:**
 - ⇒ Nerve agent/organophosphate poisoning with signs and symptoms
 - ⇒ Known exposure, prior to onset of signs and symptoms
- **Contraindications:**
 - ⇒ None with known exposure
- **Precautions/side effects:**
 - ⇒ For use on responders/crew only. Not for use on public
- **Dosage/administration:**
 - ⇒ Minor symptoms: salivation, lacrimation, visual disturbances
 - ⇒ **Adults**
 - ◇ Atropine 2 mg IV/IO/IM every 5 minutes until symptoms resolve
- Major symptoms: altered mental status, seizures, respiratory distress, respiratory arrest
 - ⇒ **Adults**
 - MARK 1 Kit X 3 IM IMMEDIATELY
 - Repeat Atropine 2 mg IV/IO/IM every 5 minutes until symptoms resolve
 - Lorazepam 1-2 mg IV/IO/IM or Diazepam Auto-injector 10mg IM

Methylprednisolone (Solumedrol[®])

- **Pharmacologic properties/ action(s):**
 - ⇒ Methylprednisolone is a steroid.
 - ⇒ It has potent anti-inflammatory properties. The onset of action is several hours
- **Indications:**
 - ⇒ Acute exacerbation of asthma/COPD
 - ⇒ Anaphylaxis/ Acute allergic reactions
- **Contradictions:**
 - ⇒ Systemic fungal infections
 - ⇒ Known hypersensitivity
- **Precautions:**
 - ⇒ The rubber top of the Mix-O-Vial must be pressed so that the diluent mixes with the powder and dissolves it. Shake the mixture vigorously so that all the powder dissolves. The resulting solution must be clear in order to administer to a patient.
- **Side effects/ adverse reactions:**
 - ⇒ Adverse effects with single bolus use of Solu-Medrol are uncommon, although patients on chronic steroids are at risk for a multitude of adverse reactions.
- **Dosage/ administration:**
 - ⇒ **Adult**
 - 125 mg, IV bolus over 2 minutes
 - ⇒ **Pediatric**
 - 2 mg/kg, IV bolus over 2 minutes

Midazolam (Versed®)

- **Pharmacologic action:**
 - ⇒ A short acting benzodiazepine
 - ⇒ Sedative-hypnotic activities
 - ⇒ Effective amnestic agent
- **Indications:**
 - ⇒ Status epilepticus
 - ⇒ Cocaine (sympathomimetic) toxicity
 - ⇒ Premedication prior to cardioversion or transcutaneous pacing.
 - ⇒ Adjunctive treatment, with haloperidol, for behavioral emergencies in patients with severe agitation or aggressive behavior resulting in interference with patient care or patient/crew safety
 - ⇒ **Not indicated for Midazolam-facilitated endotracheal intubation**
- **Contraindications:**
 - ⇒ Known hypersensitivity
 - ⇒ Alcohol intoxication
- **Precautions:**
 - ⇒ Rapid IV bolus, especially in hypovolemic patients may cause hypotension and respiratory depression
 - ⇒ Effects are exacerbated in the elderly, and when administered to patients who have already ingested another CNS depressant (EtOH, barbiturates, GHB)
- **Side effects/ adverse reactions:**
 - ⇒ Confusion
 - ⇒ Drowsiness
 - ⇒ Slurred speech
 - ⇒ Respiratory depression
 - ⇒ Hypotension
 - ⇒ Nausea
 - ⇒ Vomiting
- **Dosage/administration:**
 - ⇒ **Adult**
 - Seizures
 - ◇ < 60 y/o 5 mg IM/IN
 - ◇ > 60 y/o 2.5 mg IM/IN
 - Procedural Sedation
 - ◇ 1-2 mg IV/IO, titrate to maximum dose of 4 mg

Midazolam (Versed®)-continued

- Therapeutic Hypothermia
 - ◇ 1-2 mg IV/IO every 3-5 minutes (max dose 10 mg)
- Sedation post RSA
 - ◇ 3 mg IV/IO (with morphine), may repeat 2 additional times

⇒ **Pediatric**

- Procedural sedation
 - ◇ 0.1 mg/kg IV/IO (max dose 2 mg)
- Seizures
 - ◇ 0.2 mg/kg IN (max dose 3 mg)

Morphine Sulfate

- **Pharmacologic properties/ action(s):**
 - ⇒ Morphine is a narcotic analgesic.
 - ⇒ It depresses the central nervous system and suppresses pain via binding at opioid receptors of the brain. It increases venous capacitance, decreases venous return, and produces mild peripheral vasodilation. Morphine also increases myocardial oxygen demand.
- **Indications:**
 - ⇒ Chest Pain associated with suspected myocardial ischemia
 - ⇒ Hypertension associated with chest pain and/or Pulmonary edema
 - ⇒ Thermal burns
 - ⇒ Frostbite
 - ⇒ Isolated extremity injury
 - ⇒ Premedication for cardioversion, or transcutaneous pacing
- **Contraindications:**
 - ⇒ Hypotension, (SBP <100 mmHg), or volume depletion
 - ⇒ Head trauma
 - ⇒ Acute alcohol intoxication
 - ⇒ Acute exacerbation of asthma
 - ⇒ Known hypersensitivity
- **Precautions:**
 - ⇒ Morphine is detoxified by the liver
 - ⇒ It is potentiated by alcohol, antihistamines, barbiturates, phenothiazines, and other sedatives.
- **Side effects/ adverse reactions:**
 - ⇒ Central Nervous System
 - Euphoria
 - Drowsiness
 - Pupillary constriction
 - Respiratory arrest
 - ⇒ Cardiovascular
 - Bradycardia
 - Hypotension
 - ⇒ Gastrointestinal
 - Decreases gastric motility
 - Nausea and vomiting
 - ⇒ Genitourinary
 - Urinary retention

Morphine sulfate-continued

- ⇒ Respiratory
 - Bronchoconstriction
 - Decrease cough reflex

- **Dosage/ administration:**

- ⇒ **Adult**

- Acute Pulmonary Edema
 - ◇ 5-10 mg IV/IO if SBP > 150 mmHg
- Post intubation sedation
 - ◇ 3 mg IV/IO (with Midazolam). May repeat 2 addition doses
- Chest Pain
 - ◇ 2-4 mg slow IVP every 5 minutes until pain relief
 - Contraindicated if systolic BP < 100
 - Maximum *standing dose* 15 mg
- Pain (other causes)
 - ◇ 2-4 mg slow IVP every 2 minutes until pain relief
 - Contraindicated if systolic BP < 100
 - Maximum *standing dose* 15 mg

- ⇒ **Pediatric**

- 0.1 mg/kg IV/IO. May repeat once in 10 minutes.

Naloxone (Narcan[®])

- **Pharmacologic properties/ action(s):**
 - ⇒ Naloxone is a mu receptor (narcotic) antagonist.
 - ⇒ The mechanism of action is not fully understood. It does appear that Narcan antagonizes the effects of opiates by competing at the same receptor sites.
 - ⇒ When given IV, the action is apparent within two (2) minutes.
 - IM or SC administration is slightly less rapid.
- **Indications:**
 - ⇒ Altered mental status
 - ⇒ Naloxone is indicated for the complete or partial reversal of narcotic depression and respiratory depression secondary to narcotics or related drugs (examples include, but are not limited to the following):
 - Heroin, or any opiate derivative
 - Meperidine (Demerol), Morphine, Methadone
 - Codeine
 - Lomotil
 - Hydromorphone (Dilaudid)
 - Pentazocin (Talwin)
 - Propoxyphene (Darvon, Darvocet)
 - Oxycodone (Percodan, Percocet, Tylox)
 - Hydrocodone (Vicodin, Anexia, Lortab)
- **Contraindications:**
 - ⇒ Narcan is contraindicated in patients known to be hypersensitive to it.
- **Precautions:**
 - ⇒ Narcan should be administered cautiously to persons including newborns of mothers who are known or suspected to be physically dependent on opiates – may precipitate an acute abstinence syndrome.
 - ⇒ May need to repeat Narcan since duration of action of some narcotics may exceed that of Narcan.
 - ⇒ Narcan is not effective against a respiratory depression due to non-opioid drugs.
 - ⇒ Use caution during administration as patient may become violent as level of consciousness increases
 - ⇒ **Patients who become responsive secondary to naloxone administration are NOT authorized to refuse medical care and transportation**
 - **Transport all such patients as medically incapacitated**
 - **Utilize the assistance of LEO if necessary**

Naloxone (Narcan[®]) continued

- **Side effects/ adverse reactions:**

- ⇒ Central Nervous System (occurs in narcotic dependent patients)

- Tremor
- Agitation
- Belligerence
- Pupillary dilation
- Seizures
- Increases tear production
- Sweating

- ⇒ Cardiovascular

- Hypertension
- Hypotension
- Ventricular tachycardia
- Pulmonary edema
- Ventricular fibrillation

- ⇒ Gastrointestinal

- Nausea
- Vomiting

- **Dosage/ administration:**

- ⇒ **Adult**

- With respiratory depression
 - ◇ Naloxone (Narcan) 2 mg IVP every 3 min as needed
(Maximum 8 mg)
 - ◇ Naloxone (Narcan) 2 mg IN/IM X 1 dose if no IV access.
- Without respiratory depression
 - ◇ Naloxone (Narcan) 0.4 mg IVP every 3 min as needed
(Maximum 2 mg)

- ⇒ **Pediatric**

- 0.1 mg/kg IV/IO/IM (Maximum individual dose 2.0 mg)

Nitroglycerin (Nitrostat[®])

- **Pharmacologic properties/ action(s):**
 - ⇒ Nitroglycerin causes relaxation of vascular smooth muscle.
 - ⇒ Nitroglycerin is a direct vasodilator which acts primarily on the venous system, although it also produces direct coronary artery vasodilation as a result. There is a decrease in venous return which decreases the workload on the heart and thus, decreases myocardial oxygen demand. Sublingual Nitroglycerin spray is preferred as it is more reliably absorbed and bio-available.
- **Indications:**
 - ⇒ Angina Pectoris/Suspected Acute MI
 - ⇒ Cardiac alert
 - ⇒ Hypertension associated with pulmonary edema
- **Contraindications:**
 - ⇒ Hypertension associated with acute stroke (stroke alert), or severe brain injury
 - ⇒ Systolic BP < 90 mmHg
 - ⇒ Systolic BP < 110 mmHg without IV if IMI, with/without RV infarct
 - ⇒ Known hypersensitivity
- **Precautions:**
 - ⇒ Because of an easily developed tolerance, patients on chronic nitrate therapy may require larger doses of nitroglycerine during acute anginal episodes. Nitro tablets are inactivated by light, air and moisture. Must be kept in amber glass containers with tight-fitting lids. Do not leave cotton in container. Once opened, nitroglycerine has a shelf life of 3 months. Nitro spray has a shelf life of 1 to 2 years. Alcohol will accentuate vasodilating and hypotensive effects.
 - ⇒ Open mouth and bring the canister as close as possible, press button firmly with forefinger to release spray onto or under tongue. Advise patient not to inhale spray; or place tablet directly under tongue and advise patient not to swallow. Note the expiration date on all nitroglycerin self administered by the patient prior to your arrival.
- **Dosage/ administration:**
 - ⇒ **Adult**
 - 0.4 mg spray sublingually, every 3 minutes as needed for chest pain, if no contraindication develops
 - ◇ contraindicated if systolic BP < 90 mm Hg or Viagra/Levitra use in past 24 hours and Cialis use in past 48 hours.

Nitroglycerin (Nitrostat®) continued

◇ use with caution in inferior wall MI or acute right ventricular infarct

→ ensure IV line started, SBP \geq 110 and be prepared to administer IV NS boluses at 250 cc if hypotension develops

⇒ **Pediatric**

▪ Not indicated

Ondansetron Hydrochloride (Zofran[®])

- **Pharmacologic action:**
 - ⇒ Ondansetron hydrochloride (HCl) is a selective blocking agent of the serotonin 5-HT₃ receptor type.
- **Indications:**
 - ⇒ Severe, persistent nausea/vomiting
- **Contraindications:**
 - ⇒ Known hypersensitivity
- **Precautions:**
 - ⇒ Routine prophylaxis is not recommended for patients in whom there is little expectation that nausea and/or vomiting will occur
- **Side effects/ adverse reactions:**
 - ⇒ Pregnancy Category B
 - Reproduction studies have been performed in pregnant rats and rabbits at I.V. doses up to 4 mg/kg per day and have revealed no evidence of impaired fertility or harm to the fetus due to ondansetron.
 - ⇒ Little information is available about dosage in pediatric patients under 2 years of age
- **Dosage/administration:**
 - ⇒ **Adult**
 - 4 mg IV/IO/IM/ODT
 - ⇒ **Pediatric**
 - **Medical Control Option**

Rocuronium

- **Pharmacologic properties:**
 - ⇒ Intermediate acting non depolarizing neuromuscular blocker
 - ⇒ Binds cholinergic receptors at post synaptic motor end plate preventing acetylcholine mediated neurotransmission
 - ⇒ Complete paralysis occurs within 2 minutes and may last greater than 60 minutes
- **Indications:**
 - ⇒ Paralysis a part of the RSA procedure
- **Contraindications:**
 - ⇒ Unable to effectively ventilate with a bag-valve-mask
 - ⇒ Hypersensitivity
- **Precautions/side effects:**
 - ⇒ Only to be used in a setting where a trained provider capable of endotracheal intubation/advanced airway placement.
 - ⇒ Causes apnea, oxygen and resuscitation medication and equipment must be readily available
- **Dosage/administration:**
 - ⇒ 1 mg/kg IV/IO

Sodium Bicarbonate

- **Pharmacologic properties/ action(s):**
 - ⇒ Sodium bicarbonate is an endogenous anion that reacts with hydrogen ions to form water and carbon dioxide to buffer metabolic acidosis.
 - ⇒ An alkalizing agent used to buffer acids present in the body during and after severe hypoxia. It's effect is to raise the serum pH. This effect is favorable in the treatment of pre-existing metabolic acidosis, hyperkalemia, tricyclic anti-depressant/salicylate (aspirin)/or phenobarbital overdose. Sodium bicarbonate is effective only when administered with adequate ventilation and oxygenation.
- **Indications:**
 - ⇒ Bicarbonate responsive metabolic acidosis precipitating cardiac arrest
 - ⇒ Hyperkalemia
 - ⇒ Tricyclic antidepressant overdose
- **Contraindications:**
 - ⇒ Congestive heart failure
 - ⇒ Alkalotic states
 - ⇒ Hypoxic Lactic Acidosis
- **Precautions:**
 - ⇒ Excessive bicarbonate therapy inhibits the release of oxygen, includes hyperosmolarity and hypernatremia, and produces paradoxical acidosis in myocardial and cerebral cells.
 - ⇒ Bicarbonate does not improve the ability to defibrillate.
 - ⇒ May inactivate simultaneously administered catecholamines.
 - ⇒ Will precipitate if mixed with calcium chloride.
- **Side effects/ adverse reactions:**
 - ⇒ Metabolic alkalosis
 - ⇒ Hypernatremia/Hyperosmolality
 - ⇒ Cerebral acidosis (paradoxical effect)
 - ⇒ Sodium and H₂O retention which can cause CHF
- **Dosage/ administration:**
 - ⇒ **Adult**
 - 1 meq/kg IV. Repeat once with 1.0 meq/kg in 5-10 minutes.
 - ⇒ **Pediatric**
 - 1 meq/kg IV. Maximum dose is 50 mEq
 - ⇒ **Infant**
 - 0.5 meq/kg IV (diluted) slowly. May repeat in 10 minutes.

Succinylcholine

- **Pharmacologic properties:**
 - ⇒ Short acting depolarizing neuromuscular blocker
 - ⇒ Binds cholinergic receptors at motor end plate causing depolarization, inhibiting further neurotransmission
 - ⇒ Complete paralysis occurs within 60-90 seconds and lasts for 5-6 minutes
- **Indications:**
 - ⇒ To facilitate endotracheal intubation/advanced airway placement in RSA
- **Contraindications:**
 - ⇒ Hypersensitivity
 - ⇒ Hyperkalemia
 - ⇒ Myopathy or neuromuscular disease
 - ⇒ History of Malignant Hyperthermia
 - ⇒ Recent history of major burn or crush injury (> 48 hours after the injury)
 - ⇒ End Stage Renal Disease
 - ⇒ History of Plasma Cholinesterase deficiency
 - ⇒ Unable to effectively ventilate with a bag-valve-mask
 - ⇒ Open globe eye injuries
 - ⇒ Glaucoma
 - ⇒ Increased intracranial pressure
- **Precautions/side effects:**
 - ⇒ Only to be used in a setting where a trained provider capable of endotracheal intubation/advanced airway placement.
 - ⇒ Causes apnea, oxygen and resuscitation medication and equipment must be readily available
 - ⇒ Apnea, wheezing, fasciculations, increased ocular and intracranial pressure, bradycardia, hypotension
- **Dosage/administration:**
 - ⇒ 2 mg/kg IV/IO (maximum individual dose 200 mg)

Thiamine Hydrochloride

- **Pharmacologic properties/ action(s):**
 - ⇒ Thiamine is vitamin B1.
 - ⇒ A cofactor needed for the utilization of glucose.
 - Deficiency of Thiamine can lead to Wernicke's encephalopathy (ophthalmoplegia, ataxia, and confusion) or Korsakoff's syndrome (amnesia, confabulation, and impaired memory).
 - Chronic ETOH abuse interferes with intake, absorption, and utilization of Thiamine.
- **Indications:**
 - ⇒ Altered mental status (especially in alcoholic patient)
 - ⇒ Wernicke's or Korsakoff's
 - ⇒ Delirium Tremens (DT's)
- **Contraindications:**
 - ⇒ Known hypersensitivity
- **Precautions:**
 - ⇒ Should be given prior to the administration of D50 because administration of glucose may precipitate acute symptoms of thiamine deficiency in marginally nourished subjects.
 - Administer Thiamine prior to D50 in all patients with a history of ethanol abuse.
- **Side effects/ adverse reactions:**
 - ⇒ Avoid rapid IVP
- **Dosage/ administration:**
 - ⇒ 100 mg IV or IM

Tetracaine

- **Pharmacologic properties:**
 - ⇒ Ophthalmic anesthetic
 - ⇒ Ester compound
 - ⇒ Produces effects by interfering with nerve permeability to sodium
- **Indications:**
 - ⇒ Ophthalmic anesthesia for eye irrigation
- **Contraindications:**
 - ⇒ Known hypersensitivity
- **Precautions/side effects:**
 - ⇒ Produces eye anesthesia and the inability to detect eye foreign bodies, therefore the eye must be covered after completion of irrigation
- **Dosage/administration:**
 - ⇒ 1-2 gtts to affected eye prior to irrigation

Vasopressin

- **Pharmacologic properties:**
 - ⇒ The naturally occurring antidiuretic hormone.
 - ⇒ Acts as a non-adrenergic peripheral vasoconstrictor.
 - ⇒ Acts by direct stimulation of smooth muscle V₁ receptors (causes pallor of the skin, nausea, intestinal cramps, bronchial constriction, uterine contractions, and vasoconstriction).
 - ⇒ Half life is 10 – 20 minutes
 - ⇒ Increases coronary perfusion pressure, vital organ blood flow, and cerebral oxygen delivery
 - ⇒ V₁ receptor interaction during CPR causes intense peripheral vasoconstriction, with less coronary and renal vasoconstriction, and cerebral vasodilatation
- **Indications:**
 - ⇒ Ventricular fibrillation/pulseless V Tach
- **Contraindications:**
 - ⇒ None in a ventricular fibrillation cardiac arrest
- **Precautions/side effects:**
 - ⇒ May precipitate angina pectoris in conscious patients
- **Dosage/administration:**
 - ⇒ 40 U, IV bolus (one time only dose)