Levy County Department of Public Safety

Clinical Treatment Protocols

Version 9: **26 January 2025**

Preface

Patients for whom EMS is requested, EMS professionals providing life-sustaining and life-saving care, EMS professionals supporting care through dispatch, education and training, quality improvement, and administrative leadership, and EMS physicians supporting all aspects of EMS all deserve the finest clinical treatment protocols available. This protocol set was developed in that exact spirit to achieve that exact mission.

The Clinical Treatment Protocols are developed and circulated under authorization of the Medical Director for Levy County in accordance with Florida Statute 401 and Florida Administrative Code (FAC) 64J-1. These protocols are intended to provide uniform treatment for all patients who receive prehospital care within the county. These protocols apply exclusively to agencies that formally participate in centralized medical oversight provided by the Levy County Department of Public Safety Medical Director. It is the sincere hope that these protocols will guide EMS professionals serving Levy County, Florida in achieving the best clinical outcome possible for each and every patient receiving their dedicated care.

This compilation of protocols reflects essential care for the wide spectrum of patient ages, conditions, and acuities encountered by EMS professionals in Levy County. While attempts have been made to cover all patients who access our system, the Medical Director realizes that unforeseen scenarios or situations may arise. It is suggested that for those instances, medical personnel would follow the "General Approach to All Patients" Protocols (or other appropriate protocol), exercise their own judgment, and seek appropriate direction from on-line medical direction for additional orders. Our goal is to provide care when appropriate, relieve pain and suffering, do no harm, with reasonable regard for safety of the patient, peers, and the public. The patient's best interest should be the final determinant for all decisions.

Transport should be initiated as soon as possible (with the exception of non-traumatic cardiac arrest where return of spontaneous circulation (ROSC) is most dependent upon effective, immediate interventions on scene).

EMS professionals should never perform emergency medical care outside of their individual scope of practice established by professional training, certification/licensure, and as credentialed by the Medical Director.

When possible, medication alternatives are indicated in these protocols in light of current and anticipated future medication supply shortages affecting EMS systems throughout the United States.

Ongoing Improvement

Exhaustive efforts have been undertaken in developing and reviewing these protocols for accuracy. Despite every human effort, unintended typographical errors may persist. EMS professionals are directed to always deliver care with the highest regard for patient safety and when questions arise concerning care directives, care sequences, and/or medication selections and dosages, answers should be sought via on-line medical direction during real-time patient care and via the medical directors and officer personnel during protocol training and review events.

It is our desire that these protocols remain relevant and up-to-date. Anyone with ideas for improvement should email the Medical Director (ameyer@levydps.com) with their suggestions. If there are specific questions about intent, meaning, or interpretation of the protocols, these should be directed to the Medical Director.

The above listed email will serve as a collection point for all corrections and suggestions. Please understand that protocol changes are an ongoing, progressive, process requiring involvement of many parties. Not all suggestions can or will be used, but all will be reviewed by the protocol committee and the Medical Directors. We look forward to your suggestions and corrections to assure that we field the finest prehospital care protocol.

The following table may be used as rapid reference for common medications.
Refer to individual protocols for specific information, dosing, and administration.
This table does not supersede the direction of individual protocols.

Medication	Indications	Refer to Protocol	Dose	FYI
Activated Charcoal (Actidose)	**Toxic ingestion within 1-2 h**	Overdose / Poisonings	Adult • *1 – 2 g/kg* (30 – 100 g) PO. Peds • *1 – 2 g/kg* (30 – 100 g) PO.	**Description**: Fine black powder that binds and absorbs toxins **Onset**: Immediate **Duration**: While in GI tract **Contraindications**: Corrosives, caustics, petroleum distillates
Adenosine (Adenocard)	**Supraventricular tachycardia**	Narrow Complex Tachycardia	Adult • *6 mg* rapid IV/IO, followed by flush. *12 mg* IV/IO may be given after 2 min. Peds • *0.1 mg/kg* (max single dose: 6 mg) rapid IV/IO, followed by flush. *0.2 mg/kg* (max single dose: 12 mg) IV/IO may be given after 2 min.	**Description**: slows conduction through AV node **Onset**: Immediate **Duration**: 10 s **Contraindications**: 2º or 3º degree block, VT
Albuterol (Proventil)	**Acute bronchospasm** **Anaphylaxis** **Hyperkalemia**	Airway Emergencies Allergic Reaction / Anaphylaxis	*2.5 mg* / 3 mL nebulized • May repeat every 20 min if wheezing persists	**Description**: Bronchial smooth muscle dilation **Onset**: 5 – 8 min after inhalation **Duration**: 2 – 6 h after inhalation **Contraindications**: none
Amiodarone (Cordarone)	**Cardiac arrest - <u>pulseless</u>** **Ventricular fibrillation** **Pulseless ventricular tachycardia**	Cardiac Arrest – VFib / Pulseless VTach Torsades de Pointes	Adult • *300 mg* IV/IO bolus. For persistent VF/VT, second dose of *150 mg* IV/IO bolus. Max total dose: 450 mg. • 150 mg infusion over 10-15 min. Peds • *5 mg/kg* (max single dose: 300 mg) IV/IO bolus. For persistent VF/VT, repeat *5 mg/kg* IV/IO bolus on second and third round (max total dose: 15 mg/kg).	**Description**: Antidysrhythmic with multiple mechanisms **Onset**: within minutes **Duration**: variable **Contraindications**: Bradycardia, 2º or 3º degree block, cardiogenic shock **CAUTION: BEWARE** of slow VT/wide complex tachycardia (HR ~ 120). Consider possible <u>hyperkalemia</u> in these situations. Giving amiodarone in these situations could be lethal.
	<u>With pulse</u> **Wide complex tachycardia** **Ventricular tachycardia (with pulse)**	Wide Complex Tachycardia Torsades de Pointes	Adult • *150 mg* IV/IO bolus. Peds • *5 mg/kg* (max single dose: 300 mg) IV/IO over 30 min.	

Medication	Indications	Refer to Protocol	Dose	FYI
Aspirin (ASA, Bayer)	**Acute coronary syndrome** **Myocardial infarction**	Chest Pain	Adult • *324 mg* PO. Chewed preferred over swallowing. Peds • not indicated.	**Description**: Decreases inflammation, decreases platelet aggregation **Onset**: 15 – 30 min **Duration**: 4 – 6 h **Contraindications**: Hypersensitivity, hemorrhagic stroke, active GI bleeding

Atropine	**Bradycardia**
	Beta blocker overdose
	Calcium channel blocker overdose
	Heart block
	Junctional/escape rhythms
	Organophosphate poisoning
		Bradycardia
		Overdose / Poisonings
			Adult
			• Bradycardia: *1 mg* IV/IO. May repeat every 3 min (max total dose: 3 mg)
			• Organophosphate: *2 mg* IV/IO. Repeat by doubling dose every 3 min if previous dose did not induce response. Titrate to bronchial secretions.
			
			Peds
			• Bradycardia: *0.02 mg/kg* (min dose: 0.1 mg; max single dose: 0.5 mg) IV/IO. May repeat every 3 min. Max total dose for a child: 1 mg; for adolescent: 3 mg.
			• Organophosphate:
			  ○ <12 years: *0.05 – 0.1 mg/kg/dose* IV/IO. Repeat by doubling dose every 3 min if previous dose did not induce response. Titrate to bronchial secretions.
			  ○ >12 years: *2 mg IV/IO*. Repeat by doubling dose every 3 min if previous dose did not induce response. Titrate to bronchial secretions.
				Description: Block parasympathetic (inhibit secretions, increase heart rate, enhance AV conduction), antagonize organophosphate insecticides and nerve gas
				Onset: Rapid
				Duration: 2 – 6 h
				Contraindications: Tachycardia, hypersensitivity, hypothermic bradycardia, caution in myocardial ischemia

	Pediatric (< 5 yo) intubation to prevent bradycardia	Rapid Sequence Induction	*0.02 mg/kg* (min dose: 0.1 mg; max single dose: 0.5 mg) IV/IO	
Calcium chloride	**Hyperkalemia (suspected or actual)** **Hypocalcemia** **Beta blocker overdose** **Calcium channel blocker overdose**	Bradycardia Overdose / Poisonings	Adult • *1 g* (10 mL of 10% solution) slow IV/IO Peds • *20 mg/kg* (0.2 mL/kg of 10% solution) (max single dose: 1 g) slow IV/IO	**Description**: Essential electrolyte, needed for cardiac contractility, coagulation pathway **Onset**: 5 – 15 min **Duration**: dose-dependent, may last up to 4 h **Contraindications**: Digoxin toxicity, VF, do NOT use routinely in cardiac arrest unless suspect hyperkalemia

Medication	Indications	Refer to Protocol	Dose	FYI
Cefazolin (Ancef)	**Open Fractures**	Open Fractures Trauma – Pediatric	Adult • *2 g* IV/IO as infusion over 10 min ***or*** slow IV push over 3-5 min ○ Infusion: Reconstitute with 2.5 mL NS, then dilute in 100 mL NS bag, and administer as infusion over 10 min ***Or:*** ○ IVP: Reconstitute with 2.5 mL NS, then dilute in 10 mL NS, and administer as slow IV push over 3-5 min Peds • *35 mg/kg* (max *2 g*) IV/IO as infusion over 10 min ***or*** slow IV push over 3-5 min ***Or:*** ○ Infusion (may use for peds age 7 and above): Reconstitute with 2.5 mL NS (creates concentration of 330 mg/mL), then dilute dose in 100 mL NS bag, and administer as Infusion over 10 min ○ IVP (may use for peds any age): Reconstitute with 2.5 mL NS (creates concentration of 330 mg/mL), then dilute dose in 10 mL NS, and administer as slow IV push over 3-5 min	**Description**: Cephalosporin antibiotic **Onset**: 1 h **Duration**: 6 h **Contraindications**: known hypersensitivity reaction to Cephalosporins (e.g. Cefazolin, Cefadroxil, Cephalexin, Ceftriaxone, Cefepime) or anaphylaxis to Penicillins (e.g. Amoxicillin, Ampicillin, Nafcillin)
Dextrose 50%	**Altered mental status (unexplained)** **Hypoglycemia** **Seizure**	Altered Mental Status Cerebrovascular Accident Diabetic Emergencies Seizure	Adult • D50W *12.5 – 25 g* slow IV. May repeat once. Peds • D10W at *5 mL/kg* for children < 1 yr old (Max: 50 mL) ○ Waste 40 mL of D50 and draw up 40 mL of NS • D25W at *2 mL/kg* for children 1-8 yrs old (Max: 50 mL) ○ Waste 25 mL of D50 and draw up 25 mL of NS • D50W at *1 mL/kg* for children ≥ 9 yrs old (Max: 50 mL)	**Description**: Simple sugar used by the body **Onset**: 1 min **Duration**: Depends on degree of hypoglycemia and coexisting medications **Contraindications**: Suspected stroke without hypoglycemia

Medication	Indications	Refer to Protocol	Dose	FYI
Diltiazem (Cardizem)	**Narrow Complex Tachycardia (AFib, AFlutter, MAT)**	Narrow Complex Tachycardia	Adult • *0.25 mg/kg* (max single dose: 20 mg) IV/IO over 2 min (systolic BP > 90 mmHg) ○ Contraindicated if wide complex (QRS > 120 msec) or history of Wolf-Parkinson-White (WPW) • If no response in 15 min, *0.35 mg/kg* (max single dose: 25 mg) IV/IO over 2 min • Consider *5 mg/hr* IV infusion (100 mg in 100 mL NS at rate of 5 mL/hr)	**Description**: Calcium channel blocker, slows conduction, increases coronary and peripheral vasodilation **Onset**: 2 – 5 min **Duration**: 1 – 3 h **Contraindications**: Wide QRS, 2° or 3° degree block, bradycardia, hypotension, cardiogenic shock, WPW, VT
Diphenhydramine (Benadryl)	**Allergic Reaction** **Anaphylaxis** **Acute Dystonic Reaction**	Allergic Reaction / Anaphylaxis Overdose / Poisonings	Adult • *25 – 50 mg* IV/IM/IO Peds • *1 mg/kg* IV/IM/IO (max single dose: 50 mg)	**Description**: block histamine H_1 and H_2 receptors; used in allergic reaction, anaphylaxis, dystonic reaction **Onset**: 1 – 3 h **Duration**: 6 – 12 h **Contraindications**: Hypersensitivity
	Nausea / Vomiting (first trimester pregnancy or zofran allergy)	Nausea / Vomiting	Adult • *25 mg* IV	
Dopamine (Intropin)	**Bradycardia** **Congestive Heart Failure** **Shock (Cardiogenic, Septic)**	Bradycardia Dyspnea Hypotension and Shock Sepsis / SIRS	Adult and Peds • *5 – 20 mcg/kg/min* IV infusion • Titrate to maintain systolic BP > 100 mmHg	**Description**: enhances cardiac contractility, cardiac output, and blood pressure. Second-line for bradycardia (after atropine). Treatment of hypotension/shock. **Onset**: 2 – 4 min **Duration**: 10 – 15 min **Contraindications**: Tachydysrhythmia, VF

Medication	Indications	Refer to Protocol	Dose	FYI
Epinephrine (Adrenalin)	**Allergic Reaction** **Anaphylaxis** **Bradycardia** **Cardiac Arrest** **Shock (Cardiogenic, Septic)**	Allergic Reaction / Anaphylaxis Bradycardia Cardiac Arrest Hypotension and Shock Neonatal Resuscitation Sepsis / SIRS	Adult • Anaphylaxis: *0.3 mg* (1:1,000) IM, repeat every 10 min as needed • Severe allergic reaction or severe asthma (profound hypotension/unresponsive): *1 mL* (1:10,000) slow IV/IO • Hypotension and Shock: *2 – 10 mcg/min* IV infusion, titrate to maintain systolic BP > 90 mmHg • Cardiac Arrest: *1 mg* (10 mL of 1:10,000) IV/IO every 3-5 min Peds • Anaphylaxis: *0.01 mg/kg* (0.01 mL/kg of 1:1,000) (max single dose: 0.3 mg) IM, repeat every 10 min as needed • Bradycardia: *0.01 mg/kg* (0.1 mL/kg of 1:10,000) (max single dose: 1 mg or 10 mL) IV, repeat every 3-5 min as needed • Hypotension and Shock: *0.1 – 1 mcg/kg/min* IV/IO infusion • Cardiac Arrest: *0.01 mg/kg* (0.1 mL/kg of 1:10,000) (max single dose: 1 mg) IV/IO every 3-5 min Neonatal • Epinephrine *0.1 mL/kg* (1:10,000) IV	**Description**: alpha, beta agonist. Treatment of bronchoconstriction, hypotension, cardiac arrest. **Onset**: 1 – 2 min **Duration**: 5 – 10 min **Contraindications**: Hypovolemic shock **IMPORTANT:** **IV administration should only be for critical patients.** **Epinephrine 1:1,000 should never be given as an IV bolus**
Epinephrine (nebulized)	**Croup** **Epiglottitis**	Airway Emergencies – Pediatric Dyspnea	• Epinephrine **1:1,000** – nebulize *0.5 mL/kg* (max: 5 mL) of **1:1,000** epi via nebulizer	**Description**: Bronchodilator, reduces bronchospasm, improves laryngeal edema **Onset**: within 5 min **Duration**: 1 – 3 h **Contraindications**: Hypertension

Medication	Indications	Refer to Protocol	Dose	FYI
Epinephrine (push dose)	**Hypotension and Shock** **Pre-RSI Hypotension**	Hypotension and Shock Rapid Sequence Induction	Mix 1ml 1:10,000 Epinephrine in 9 ml of Normal Saline to create concentration of 10 mcg/ml Adult: • Shock: *10-20 mcg (1-2 mL)* IV/IO every 3-5 minutes for systolic blood pressure < 90 mmHg to treat profound hypotension while setting up continuous vasopressor infusion (Max 2 doses) • RSI premedication for hypotension: *10-20 mcg (1-2 mL)* IV/IO every 3-5 minutes for persistent systolic blood pressure < 90 mmHg (Max 2 doses) Peds: • RSI premedication for hypotension: *1 mcg/kg (0.1 mL/kg) IV/IO* every 3-5 minutes for persistent systolic blood pressure less than lower limit of normal for patient's age; refer to normal pediatric vital signs chart (Max single dose: 10 mcg or 1 mL) (Max 2 doses)	**Description**: alpha, beta agonist. Treatment of bronchoconstriction, hypotension, cardiac arrest. **Onset**: 1 – 2 min **Duration**: 5 – 10 min **Contraindications**: Hypovolemic shock
Etomidate (Amidate)	**Induction agent (RSI)**	Rapid Sequence Induction	Adult • *0.3 mg/kg* IV/IO Peds (> 10 yo) • *0.3 mg/kg* IV/IO	**Description**: Anesthetic **Onset**: < 1 min **Duration**: 5 – 10 min **Contraindications**: hypersensitivity
Fentanyl (Sublimaze)	**Analgesia**	Abdominal Pain Burns Cardiac Pacing Chest Pain – Cardiac CHF / Pulmonary Edema Eye Emergencies Severe Pain Snake Bite STEMI Trauma Vaginal Bleeding	Adult • *1 mcg/kg* (max single dose: 100 mcg) slow IV/IO; may repeat after 10 minutes as needed for severe pain (max total dose: 200 mcg) • **OR** *100 mcg* intranasal via MAD (divide dose equally between nostrils) • Contraindicated if systolic BP < 90 mmHg Peds • *1 mcg/kg* (max single dose: 50 mcg) slow IV/IO; may repeat after 10 minutes as needed for severe pain (max total dose: 100 mcg) • **OR** *1.5 mcg/kg* (max single dose: 100 mcg) intranasal via MAD (divide dose equally between nostrils)	**Description**: Analgesic **Onset**: 1 – 2 min **Duration**: ½ to 1 h **Contraindications**: respiratory depression, caution in hypotension

Medication	Indications	Refer to Protocol	Dose	FYI
	Post-intubation analgesia / sedation	Ventilator Management Rapid Sequence Induction	Adult • *50 – 100 mcg* IV/IO • May repeat every 5 minutes as needed • Max cumulative dose 200 mcg Peds • *1 mcg/kg* IV/IO (Max single dose: *50 mcg*) • May repeat every 5 minutes as needed • Max cumulative dose: *100 mcg*	
	Post-intubation analgesia / sedation (infusion)	Ventilator Management Rapid Sequence Induction	• *1 – 4 mcg/kg/hr* IV/IO infusion	
Glucagon	**Beta blocker overdose** **Calcium channel blocker overdose** **Hypoglycemia**	Altered Mental Status Bradycardia Diabetic Emergencies Overdose / Poisonings	Adult • Hypoglycemia*: 1 mg* IM • Calcium channel blocker or Beta blocker overdose: *3 mg* slow IV/IO Peds • *0.5 mg* (< 20 kg) or *1 mg* (≥ 20 kg) IM	**Description**: Glucose generation, increases inotropy at the heart (counteract BB and CCB overdose) **Onset**: 1 min **Duration**: 60 – 90 min **Contraindications**: hypersensitivity
Haloperidol (Haldol)	**Behavioral Emergencies**	Behavioral Emergencies Sedative Agent Use	Adult • *5 mg* IM. May repeat once after 5 minutes if adequate sedation not achieved after initial dose.	**Description**: antipsychotic used in the treatment of agitation and psychosis **Onset**: 15 min **Duration**: 120 min **Contraindications**: prolonged QT or dementia-related psychosis
Ipratropium (Atrovent) **0.02%**	**Acute bronchospasm**	Airway Emergencies Allergic Reaction / Anaphylaxis	Adult • *0.5 mg* / 2.5 mL via nebulizer • May repeat every 20 minutes if wheezing persists, for a max of 3.	**Description**: Bronchodilation **Onset**: 5 – 15 min **Duration**: 4 – 6 h **Contraindications**: hypersensitivity
Ketamine (Ketalar)	**Analgesia**	Abdominal Pain Burns Cardiac Pacing Severe Pain Snake Bite Trauma Vaginal Bleeding	Adult • *0.1 – 0.3 mg/kg* (max single dose: 30 mg) slow IV/IO • *Caution when systolic > 160 mmHg* Peds Use alternative analgesics in pediatric patients	**Description**: Acts on limbic system and cortex → analgesia, amnesia **Onset**: 30 s **Duration**: 5 – 10 min **Contraindications**: CVA, severe HTN, elevated ICP, hypersensitivity

Medication	Indications	Refer to Protocol	Dose	FYI
	Management of psychiatric disturbances	Psychiatric Disturbances	Adult • *1 mg/kg* IV/IM. May repeat once after 10 minutes if adequate sedation not achieved after initial dose. • Max single dose: *200 mg*	
	Induction agent (RSI)	Rapid Sequence Induction	Adult • *1 – 2 mg/kg* IV/IO • Max single dose: *200 mg* Peds • *1 – 2 mg/kg* IV/IO • Max single dose: *200 mg*	
	Post-intubation analgesia / sedation	Ventilator Management Rapid Sequence Induction	Adult • *1 – 2 mg/kg* slow IV/IO • Max single dose: *200 mg* • May repeat once in 5 minutes Peds • *1 – 2 mg/kg* slow IV/IO • Max single dose: *200 mg* • May repeat once in 5 minutes	
Labetalol	**Hypertensive Emergency**	Hypertensive Emergency	For severely symptomatic patients refractory to NTG: • Goal systolic BP < 180 mmHg or diastolic BP < 100 mmHg, or to symptomatic relief ○ [**0.2 mg/kg** IV push] – for a 70 kg adult, 15 mg. Re-check blood pressure, if BP goal not reached within 5 min... ○ [**0.4 mg/kg** IV push] – for a 70 kg adult, 30 mg. Re-check blood pressure, if BP goal not reached within 5 min... ○ [**0.8 mg/kg** IV push] – for a 70 kg adult, 60 mg.	**Description**: Beta-blocker, anti-hypertensive **Onset**: 5 min **Duration**: 3 – 6 h **Contraindications**: hypotension, cardiogenic shock, hemodynamically unstable, 2° or 3° degree block, bradycardia, cocaine use **IMPORTANT:** **Cocaine use is a contraindication**
Lidocaine	**Cardiac arrest (VF/VT)** **Ventricular dysrhythmia** **Wide complex tachycardia**	Cardiac Arrest – VFib / Pulseless VTach Wide Complex Tachycardia	Adult • *1 – 1.5 mg/kg* IV/IO, may repeat dose (max total dose: 3 mg/kg) • *2 mg/min* infusion using a micro drip set Peds • *1 mg/kg* IV/IO	**Description**: Decreases automaticity, suppress PVCs, alternative to amiodarone (VF/VT) **Onset**: 30 – 90 s **Duration**: 10 – 20 min **Contraindications**: hypersensitivity, 2° or 3° degree block

Medication	Indications	Refer to Protocol	Dose	FYI
	Anesthesia for IO	Intraosseous Access	Adult • *40 mg* IO Peds • *0.5 mg/kg* IO	
Lorazepam (Ativan)	**Anti-anxiety**	Cardiac Pacing Cocaine Overdose STEMI	Adult • *1 – 2 mg* IV/IO/IM • May repeat as needed (max total dose: 4 mg)	**Description**: Benzodiazepine, antianxiety and antiseizure effect **Onset**: 5 min **Duration**: 6 – 8 h **Contraindications**: hypersensitivity, severe hypotension, shock
	Anti-epileptic	Eclampsia Seizures	Adult • *1 – 2 mg* IV/IO/IM/IN • May repeat if seizures continue (max total dose: 4 mg) Peds • *0.1 mg/kg* (max single dose: 2 mg) IV/IO/IM/IN • May repeat if seizures continue (max total dose: 4 mg) **IM midazolam is the preferred benzodiazepine in patients *without* IV access.**	
	Management of psychiatric disturbances	Psychiatric Disturbances	Adult • *1 – 2 mg* IV/IO/IM • May repeat as needed (max total dose: 4 mg)	
	Induction agent (RSI)	Rapid Sequence Induction	Adult • *0.05 mg/kg* IV/IO Peds • *0.05 mg/kg* IV/IO	
Magnesium sulfate	**Acute bronchospasm**	Airway Emergencies	Adult • *2 g* IV/IO over 10-15 minutes Peds • *50 mg/kg* (max dose: 2 g) IV/IO over 10-15 minutes	**Description**: Smooth muscle relaxation, uterine relaxation. Treats preeclampsia, bronchospasm, torsades **Onset**: Immediate **Duration**: 30 min **Contraindications**: 2° or 3° degree block

Medication	Indications	Refer to Protocol	Dose	FYI
	Preeclampsia and Eclampsia	OB Emergencies	• If ≥ 20 weeks pregnant or post-partum (up to 6 weeks), *4 g* IV over 10 minutes for either active seizures or systolic BP > 160 mmHg or diastolic BP > 120 mmHg on two readings	
	Torsades de Pointes	Cardiac Arrest	Adult • *2 g* IV/IO push over 1-2 minutes Peds • *50 mg/kg* (max dose: 2 g) IV/IO	
Methylprednisolone (Solumedrol)	**Allergic reaction** **Anaphylaxis** **Bronchospasm**	Airway Emergencies – Dyspnea Allergic Reaction / Anaphylaxis	Adult • *125 mg* IV/IO/IM Peds • *2 mg/kg* IV/IO/IM (max single dose: 60 mg)	**Description**: Synthetic steroid that suppresses inflammation **Onset**: 1 – 2 h **Duration**: 8 – 24 h **Contraindications**: n/a
Midazolam (Versed)	**Anti-anxiety**	Cardiac Pacing Cocaine Overdose STEMI	Adult • *5 mg* IM **OR** *5 mg* intranasal via MAD **OR** *2.5 mg* IV • May repeat once after 5 minutes as needed.	**Description**: Benzodiazepine, sedation prior to intubation/cardioversion, antiepileptic **Onset**: 1 – 3 min **Duration**: 2 – 6 h **Contraindications**: hypersensitivity, shock, hypotension
	Anti-epileptic	Eclampsia Seizure	Adult • *5 mg* IM **OR** *5 mg* intranasal via MAD **OR** *2.5 mg* IV • May repeat once after 5 minutes if seizures continue Peds • *0.2 mg/kg* (Max single dose: *5 mg*) IM **OR** *0.2 mg/kg* (Max single dose: *5 mg*) intranasal via MAD **OR** *0.1 mg/kg* (Max single dose: *2.5 mg*) IV • May repeat once after 5 minutes if seizures continue	
	Management of psychiatric disturbances	Psychiatric Disturbances	Adult • *5 mg* IM **OR** *5 mg* intranasal via MAD **OR** *2.5 mg* IV • May repeat once after 5 minutes as needed.	
	Induction agent (RSI)	Rapid Sequence Induction	Adult • *0.1 mg/kg* IV/IO (Max single dose: *5 mg*) Peds • *0.1 mg/kg* IV/IO (Max single dose: *5 mg*)	

Medication	Indications	Refer to Protocol	Dose	FYI
	Post-intubation analgesia / sedation	Ventilator Management Rapid Sequence Induction	Adult • *0.05 – 0.1 mg/kg* slow IV/IO (Max single dose: *5 mg*) • May repeat <u>once</u> in 5 minutes if hemodynamically stable Peds • *0.05 – 0.1 mg/kg* slow IV/IO (Max single dose: *5 mg*) • May repeat <u>once</u> in 5 minutes if hemodynamically stable	
	Post intubation analgesia / sedation (infusion)	Ventilator Management Rapid Sequence Induction	Adult • *0.02 – 0.1 mg/kg/hr* IV/IO Peds • *0.02 – 0.1 mg/kg/hr* IV/IO	
Morphine	**Analgesia**	Abdominal Pain Burns Cardiac Pacing Chest Pain – Cardiac CHF / Pulmonary Edema Eye Emergencies Severe Pain Snake Bite STEMI Trauma Vaginal Bleeding	Adult • *1 – 5 mg* IV/IO • May repeat <u>once</u> after 10 min PRN (max total dose: 10 mg) • Contraindicated if systolic BP < 100 mmHg Peds • *0.1 mg/kg* (max single dose: 5 mg) IV/IO • May repeat <u>once</u> after 10 min PRN (max total dose: 10 mg) • Contraindicated if systolic BP < 100 mmHg	**Description**: Natural opium alkaloid, analgesia, decreases preload and afterload **Onset**: 1 – 2 min **Duration**: 2 – 7 h **Contraindications**: hypersensitivity, hypotension, respiratory depression
Naloxone (Narcan)	**Narcotic/Opiate overdose**	Altered Mental Status Neonatal Resuscitation	Adult • *2 mg* IV (start at 0.4 mg for patients over 65 yo) • If respiratory depression persists, repeat *1* mg IV to a max of 8 mg Peds • *0.1 mg/kg* (max single dose: 2 mg) IV/IO/ET every 2 min PRN respiratory depression	**Description**: Competitive opioid antagonist **Onset**: 2 min **Duration**: 30 – 60 min **Contraindications**: hypersensitivity, caution if patient may experience acute withdrawal

Medication	Indications	Refer to Protocol	Dose	FYI
Nitroglycerin (Nitrostat)	**Angina** **Pulmonary edema** **Severe hypertension**	Airway Emergencies – Dyspnea Chest Pain Hypertensive Emergency	Adult • *0.4 mg* spray or tablet SL, every 5 min. Max total: 3 doses • If patient on NIPPV, use *1-2 inches* NTG 2% ointment **IMPORTANT:** Contraindicated if systolic BP < 100 mmHg Contraindicated if inferior MI Contraindicated if use of a Phosphodiesterase-5 (PDE-5) inhibitor within last 24 hours (Viagra, Levitra, or Stendra); 48 hours for Cialis.	**Description**: Preload and afterload reduction, decreases myocardial oxygen demand **Onset**: 1 – 3 min **Duration**: 30 – 60 min **Contraindications**: Hypotension, hypovolemia, hypersensitivity, RV infarct (inferior STEMI)
Norepinephrine (Levophed)	**Congestive Heart Failure** **Shock (Cardiogenic, Septic)**	Hypotension and Shock Sepsis / SIRS	Adult • *1 – 30 mcg/min* IV Peds • *0.1 – 1.0 mcg/kg/min* IV	**Description**: alpha and beta agonist, vasoconstriction, myocardial contractility **Onset**: 1 – 3 min **Duration**: 5 – 10 min **Contraindications**: hypovolemic shock, hemorrhage
Ondansetron (Zofran)	**Nausea / Vomiting**	Nausea / Vomiting	Adult • *4 mg* slow IV or *4 mg* ODT PO Peds • *2 mg* (8-15 kg) or *4 mg* (> 15 kg) ODT PO or IV	**Description**: Serotonin receptor antagonist, antiemetic **Onset**: 30 min **Duration**: 3 – 6 h **Contraindications**: hypersensitivity
Rocuronium	**Paralytic Agent (RSI)**	Rapid Sequence Induction	*1 mg/kg* IV/IO after sedating induction agent	**Description**: Neuromuscular blockade, long-acting paralytic **Onset**: 1 – 2 min **Duration**: 30 min **Contraindications**: hypersensitivity **IMPORTANT:** Must continuously monitor for signs of under-sedation (tachycardia, hypertension, tachypnea, tearing, rising EtCO2)
Sodium bicarbonate	**Crush Injury** **Hyperkalemia** **Metabolic acidosis** **Tricyclic antidepressant (TCA) overdose**	Trauma Assessment – Crush Cardiac Arrest Bradycardia Wide Complex Tachycardia Overdose / Poisonings	*1 mEq/kg* IV/IO	**Description**: Anion that buffers metabolic acidosis **Onset**: 2 – 10 min **Duration**: 30 – 60 min **Contraindications**: hypokalemia, hypocalcemia, respiratory acidosis

Medication	Indications	Refer to Protocol	Dose	FYI
Succinylcholine (Anectine)	**Paralytic Agent (RSI)**	Rapid Sequence Induction	*1 – 1.5 mg/kg* IV/IO after sedating induction agent	**Description**: Neuromuscular blockade, short-acting paralytic **Onset**: 1 min **Duration**: 5 – 10 min **Contraindications**: Burns > 24 hours, hypersensitivity, neuromuscular disorders, malignant hyperthermia, concern for hyperkalemia, crush injury, penetrating eye injury
Tetracaine (Altacaine)	**Chemical Ocular Trauma**	Ocular Trauma	*1— 2 drops* in affected eye every 5— 10 min for up to 3 doses	**Description**: Rapid and brief superficial anesthesia by inhibiting conduction of nerve impulses from sensory nerves **Onset**: 10— 20 sec **Duration**: 10 – 20 min **Contraindications**: Hypersensitivity, open injury to eye
Thiamine	**Alcoholism** **Delirium tremens** **Malnourishment**	Altered Mental Status Diabetic Emergencies	*100 mg* IV	**Description**: Carbohydrate necessary for metabolism **Onset**: Rapid **Duration**: Depends on malnourishment **Contraindications**: n/a
Tranexamic Acid (TXA)	**Traumatic Hemorrhagic Shock (< 3 hrs)** **Postpartum Hemorrhagic Shock**	Trauma Assessment and Care Tranexamic Acid (TXA) Control of External Bleeding Hypotension and Shock Obstetric Emergencies	Adult • *2 grams* **slow** IV/IO push once in 100 mL Normal Saline over 5-10 minutes	**Description**: Anti-fibrinolytic (reduces clot breakdown) **Onset**: 5-15 min **Duration**: 3 h **Contraindications**: Age < 16 for IV/IO, > 3 hours from initial injury, unknown time of injury, stable hemodynamics, non-traumatic hemorrhage (exceptions: postpartum, hemoptysis, epistaxis, intraoral)
	External Bleeding **Intraoral Bleeding (Tonsils)** **Epistaxis (Nose bleed)**	Trauma Assessment and Care Tranexamic Acid (TXA) Control of External Bleeding Airway Emergencies – Adult Dyspnea	*1 gram* soaked in gauze pad, then apply to external wound with direct pressure *1 gram* atomized to intranasal or intraoral source of bleeding (epistaxis or tonsillar bleeding)	**Description**: Anti-fibrinolytic (reduces clot breakdown) **Onset**: 5-15 min **Duration**: 3 h **Contraindications**: Age < 16 for IV/IO, > 3 hours from initial injury, unknown time of injury, stable hemodynamics, non-traumatic hemorrhage (exceptions: postpartum, hemoptysis, epistaxis, intraoral)
	Massive Hemoptysis	Airway Emergencies – Adult Dyspnea Tranexamic Acid (TXA) Control of External Bleeding	*1 gram* nebulized once for massive hemoptysis (may dilute in Normal Saline as needed)	**Description**: Anti-fibrinolytic (reduces clot breakdown) **Onset**: 5-15 min **Duration**: 3 h **Contraindications**: Age < 16 for IV/IO, > 3 hours from initial injury, unknown time of injury, stable hemodynamics, non-traumatic hemorrhage (exceptions: postpartum, hemoptysis, epistaxis, intraoral)

Amiodarone Drip

Mix 150 mg (3 ml) into 100 mL bag and utilize a 60 drop set

Dose	Drops per Minute (Gtts)
1 mg/min	41

Diltiazem (Cardizem) Drip

Mix 125 mg (25 ml) into 100 mL bag and utilize a 60 drop set

Dose	Drops per Minute (Gtts)
5 mg/hr	5

Epinephrine Drip

Mix 2 mg (2 ml) into 100 mL bag and utilize a 60 drop set

Dose	Drops per Minute (Gtts)
2 mcg/min	6
3 mcg/min	9
4 mcg/min	12
5 mcg/min	15
6 mcg/min	18
7 mcg/min	21
8 mcg/min	24
9 mcg/min	28
10 mcg/min	31

Epinephrine (Push Dose)

Mix 1ml 1:10,000 Epinephrine in 9 ml of Normal Saline to create concentration of 10 mcg/ml

Adult Dose: 10-20 mcg (1-2 mL) IV/IO q3-5 minutes (Max 2 doses)

Pediatric Dose: 1mcg/kg (0.1 mL/kg) IV/IO q3-5 minutes for persistent systolic blood pressure (refer to normal pediatric vital signs chart) (Max 2 doses)

- Maximum pediatric single dose 10 mcg (1 mL)

Fentanyl Drip (may also refer to IV Pump dosing)

Mix 500 mcg (10 ml) into 100 mL bag and utilize a 60 drop set

Weight	40 kg	50 kg	60 kg	70 kg	80 kg	90 kg	100 kg	110 kg	120 kg
Dose	Drops per Minute (Gtts)								
1 mcg/kg/hr	9	11	13	16	18	20	22	24	27
2 mcg/kg/hr	18	22	27	31	36	40	44	49	53
3 mcg/kg/hr	27	33	40	47	53	60	67	73	80
4 mcg/kg/hr	36	44	53	62	71	80	89	98	107

Lidocaine Drip

Mix 100 mg (5 ml) into 100 mL bag and utilize a 10 drop set

Dose	Drops per Minute (Gtts)
2 mg/min	21

Midazolam (Versed) Drip (may also refer to IV Pump Dosing)

Mix 5 mg (1 ml) into 100 mL bag and utilize a 10 drop set

Weight	40 kg	50 kg	60 kg	70 kg	80 kg	90 kg	100 kg	110 kg	120 kg
Dose	Drops per Minute (Gtts)								
0.02 mg/kg/hr	3	3	4	5	5	6	7	7	8
0.04 mg/kg/hr	5	7	8	10	11	12	14	15	16
0.06 mg/kg/hr	8	10	12	14	16	18	20	22	24
0.08 mg/kg/hr	11	14	16	19	22	24	27	30	32
0.1 mg/kg/hr	14	17	20	24	27	30	34	37	40

Norepinephrine (Levophed) Drip – Adult

Mix 8 mg (8 ml) into 100 mL bag and utilize a 60 drop set

Dose	Drops per Minute (Gtts)	Dose	Drops per Minute (Gtts)	Dose	Drops per Minute (Gtts)
1 mcg/min	1	**11 mcg/min**	9	**21 mcg/min**	17
2 mcg/min	2	**12 mcg/min**	10	**22 mcg/min**	18
3 mcg/min	2	**13 mcg/min**	11	**23 mcg/min**	19
4 mcg/min	3	**14 mcg/min**	11	**24 mcg/min**	19
5 mcg/min	4	**15 mcg/min**	12	**25 mcg/min**	20
6 mcg/min	5	**16 mcg/min**	13	**26 mcg/min**	21
7 mcg/min	6	**17 mcg/min**	14	**27 mcg/min**	22
8 mcg/min	6	**18 mcg/min**	15	**28 mcg/min**	23
9 mcg/min	7	**19 mcg/min**	15	**29 mcg/min**	23
10 mcg/min	8	**20 mcg/min**	16	**30 mcg/min**	24

Norepinephrine (Levophed) Drip – Pediatric

Mix 4 mg (4 ml) into 100 mL bag and utilize a 60 drop set

Weight	1 kg	2 kg	3 kg	4 kg	5 kg	10 kg	15 kg	20 kg	25 kg	30 kg	35 kg
Dose	**Drops per Minute (Gtts)**										
0.1 mcg/kg/min	1	1	1	1	1	2	2	3	4	5	5
0.2 mcg/kg/min	1	1	1	1	2	3	5	6	8	9	11
0.3 mcg/kg/min	1	1	1	2	2	5	7	9	12	14	16
0.4 mcg/kg/min	1	1	2	2	3	6	9	12	16	19	22
0.5 mcg/kg/min	1	2	2	3	4	8	12	16	20	23	27
0.6 mcg/kg/min	1	2	3	4	5	9	14	19	23	28	33
0.7 mcg/kg/min	1	2	3	4	5	11	16	22	27	33	38
0.8 mcg/kg/min	1	2	4	5	6	12	19	25	31	37	44
0.9 mcg/kg/min	1	3	4	6	7	14	21	28	35	42	49
1 mcg/kg/min	2	3	5	6	8	16	23	31	39	47	55

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Section 1. General Principles of Medical Care

The following measures shall be applied to promote prompt and efficient emergency medical care to all patients:

- The safety of EMS personnel is paramount to quality patient care.
- Emergency Vehicle Operations: All crews are expected to always use knowledge and judgment while operating an emergency vehicle. This is vital to the response, care, and transport of the patient to an appropriate facility. Patients should be prioritized to send the most appropriate resource in the most appropriate manner based upon initial dispatch.
- Scene Safety: Each scene must be evaluated for hazards upon arrival and throughout patient care. If applicable, the scene must be appropriately secured prior to contact / entry. Assess the need for additional resources as soon as possible after arrival.
- BSI / PPE: Proper personal protective equipment (PPE) and body substance isolation (BSI) must be utilized according to agency and industry standards.
- Only medical equipment / supplies approved by the Medical Director will be utilized for patient care. New equipment / supplies may be field tested, but only after evaluation and approval by the Medical Director.
- If at any time you are exposed to any blood, bodily fluids, or OPIM (other potentially infectious materials), please immediately notify your shift captain so the appropriate actions can be taken to protect you from further risk.

UNIVERSAL PRECAUTIONS

ALL BLOOD AND BODILY FLUIDS WILL BE CONSIDERED INFECTIOUS.

General practices:

- Sharps will be disposed in appropriate sharps containers
- Sharps will not be re-capped
- Hands will be cleaned, preferably with soap and water, after patient contact or contact with OPIM
    - Waterless hand cleaners may be used until soap and water are available
- Contaminated equipment will be cleaned and then disinfected
- PPE should be used to cover any areas on an employee that could provide a route for contamination
- Appropriate PPE will be worn when treating patients where blood and/or OPIM are evident or suspected
- Appropriate respiratory protection will be used if it is documented or suspected that the patient may have infectious respiratory infections (e.g., tuberculosis, measles, mumps, fever, COVID-19, influenza, etc.)

Universal Precautions Categories:

- Mechanical Devices:
    - Sharps containers and biomedical waste red bags
    - Sharps safety devices
- Personal Protective Equipment (PPE):
    - Gloves, Gowns, Eyewear, Fluid/face shields, N95 respirators
- Housekeeping:
    - Cleaning and disinfecting products, Waterless hand cleaner

Rapid extrication (moving a patient prior to initiating medical care) can be used when:

- Conditions are so volatile that it places the well-being of personnel and patient at greater risk if basic medical care is provided before extrication
- Patients are not in a position where care can be safely or practically rendered

Examples of situations which may require the use of rapid extrication:

- Environmental conditions (fires, floods, civil unrest, extreme weather, animal or insect infestation, etc.)
- Challenging patient position, location, or situation (confined space rescues, entrapment within burning or sinking vehicles, etc.)

To decide whether to move the patient to a safe location before the initiation of care:

- Consider risk of further injury vs. benefit of moving from a source of danger
- If rescue is determined to be possible, the move needs to be done rapidly and completed expediently to allow for the initiation of medical care
- Other injures (e.g., C-spine injury, occluded airway, tension pneumothorax, hemorrhage, etc.) may exist, and should be addressed if at all possible.
- Always document the circumstances that require rapid extrication.

- The definition of a patient is any person that:
    a. Has a complaint suggestive of potential illness or injury
    b. Requests evaluation for potential illness or injury
    c. Has obvious evidence of illness or injury
    d. Has experienced an acute event that could reasonably lead to illness or injury
    e. Is in a circumstance or situation that could reasonably lead to illness or injury
    f. Upon discovery of vital signs outside normal values.
    g. If there are any questions or doubts, the individual should be considered a patient
- A patient encounter shall be considered any event when signs and symptoms or a patient complaint results in evaluation or treatment.
- **All patients are to be treated with respect.**
- Cancellations: A LCDPS ALS unit may cancel their response by any of the following means:
    a. The requester calls back and advises that they no longer need EMS to respond
    b. LEO or a BLS unit (including a fire department) advises there is no patient
    c. The only recognized reason for cancellation by another Public Safety Agency is for "no patient on the scene". For minor injuries or for patients refusing treatment, the ALS unit will continue response.
- The agency or authority having jurisdiction of the EMS incident location (when on scene) is responsible for scene safety, scene command and control, and resource management decisions. Patient care and patient movement decisions shall be made in coordination with the scene supervisor or incident commander.
- Crews must be prepared for immediate medical interventions appropriate for the call level (e.g., defibrillation, airway management, etc.) upon initial patient contact.
- Whenever possible, obtain verbal consent prior to initiating treatment; respect the patient's privacy and dignity (courtesy, concern, and common sense will ensure the best possible care).
- For all 911 calls where EMTs and paramedics are in attendance, patient care decisions shall be performed by the paramedic.
    a. Advanced Life Support (ALS): The paramedic is required to attend all patients deemed ALS in the patient compartment during transport. As a general rule, an ALS patient is defined as one with signs / symptoms that fit into 1 or more of the chief complaints as outlined in the PROTOCOL. Regardless of complaint, patients who have an IV line are NOT considered BLS patients and must be tended to by a paramedic.
    b. Basic Life Support (BLS): The paramedic may designate an EMT to attend BLS patients, but the paramedic remains ultimately responsible for all patient care. The EMT must document on the run report that the paramedic, stating name and credentials, initially assessed the BLS patient. An EMT may tend to patients with a Heparin-lock or saline-lock provided the patient's chief complaint is not ALS in nature.
- Within 3 minutes of patient contact, the paramedic should decide if ALS measures will be needed. Perform a more comprehensive exam after the patient has been stabilized.
- Generally, initial assessment and therapy should be completed within 10 minutes after patient contact. Except for extensive extrication, trauma patients should be en route to a receiving facility within 10 minutes. Except for out-of-hospital cardiac arrest (OHCA) or significantly atypical situations, medical patients should be en route to the receiving facility within 20 minutes. Continue additional treatment en route.
- The CAB's (circulation, airway, breathing) will always take priority in patient management. Securing the airway, ensuring adequate gas exchange, and establishing adequate tissue perfusion should always supersede specific protocols.

- At least **two sets** of vital signs shall be obtained on all patients.
- Temperatures are required on the following: abdominal pain, altered mental status, brief resolved unexplained event (BRUE/ALTE), heat illness, hypertension, hypothermia, overdose/poison ingestion, sepsis, STEMI, stroke.
- The patient's condition will mandate how often vital signs are obtained:
    a. For a CRITICAL patient, every 5 minutes
    b. For a NON-CRITICAL patient, every 10 minutes
- For all patients in cardiac arrest, call in to your dispatcher the "patient contact time" at the time of initial patient contact, and "first shock time" at the time of initial defibrillation.
- Prior to the administration of any medication, assess for allergies. If any questions arise in reference to medication allergies, contact OLMD prior to giving any medication.
- Medication dosing: All medication dosages listed are for adults, unless otherwise specified.
    a. Adult: A patient > 12 years of age
    b. Pediatric: A patient ≤ 12 years of age or ≤ 40 kg, according to length-based tape.
    c. Infant: An infant is from birth to 1 year of age
- When caring for pediatric patients, use a weight- or length-based system to determine medication dosages and equipment sizes.
- Trauma: For traumatic situations, ages are defined by the State of Florida Trauma Transport criteria:
    a. Adult: A patient ≥ 16 years of age
    b. Pediatric: A pediatric patient has the anatomical and physical characteristics of a person younger than 16 years.
- All patients in the care of EMS shall be offered transport by ambulance to the nearest appropriate hospital or other protocol-based destination. If a patient refuses transport, a properly executed refusal process must be completed (see "Refusal of Service").
- Orders communicated directly from OLMD to paramedics caring for the patient may supersede established protocols, and should be reflected in the run report with the doctor's name included.
- Perform all procedures as per the Levy County Department of Public Safety Procedures Manual. If a procedure that is not addressed in this manual is deemed necessary, contact OLMD for orders prior to proceeding.
- If OLMD gives orders to perform a procedure that is not covered in the Levy County Department of Public Safety Procedures Manual, but is within the scope of practice of an EMT/Paramedic, perform the procedure in accordance with standards set for the level of certification.
- For all cases where patients require IV narcotics or sedative agents, continuous cardiac, pulse oximetry (SpO_2), and $etCO_2$ monitoring shall be performed (see "Sedative Agent Use").
- The Regional Poison Control Center (800-222-1222) should be contacted when handling calls involving poisonous/hazardous material exposures, overdoses, or suspected envenomations. 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.
- When using supplemental oxygen in accordance with adult or pediatric treatment protocols, adhere to the following:
    a. In patients who are noncritical, and have no evidence of respiratory distress, use only the concentration of oxygen needed to achieve SpO_2 > 93%. In most cases this can be accomplished using a nasal cannula.
    b. For patients with serious respiratory symptoms, persistent hypoxia, or where otherwise specified in protocol, use 100% supplemental oxygen via nonrebreather mask or BVM.

- Monitors/Defibrillators used under the scope of these protocols must be able to provide:
    a. Escalating energy, biphasic defibrillation (includes AED's).
    b. Continuous ECG and etCO_2 waveforms simultaneously on the screen.
- Non-transport agency personnel shall provide information pertinent to the patient's identification, assessment, and medical care to the transporting agency personnel at the time patient care responsibilities are turned over. The MIST format is preferred when time allows:

EMS TIME OUT REPORT

M	**Mechanism** or **Medical** Complaint	Name, Age, Sex **Mechanism**: Speed, Mass, Height, Restraints, Number and Type of Collisions, Helmet Use and Damage, Weapon Type **Medical**: Onset, Duration, History
I	**Injuries** or **Illness Identified**	**Head to Toe** Pain, Deformity, Injury Patterns STEMI—12-Lead / Stroke— Cincinnati
S	**Signs** and **Symptoms**	**Symptoms and Vitals** Initial, Current, Lowest Confirmed BP HR, BP, SPO_2, RR, $ETCO_2$, BG GCS: Eyes ____ Verbal ____ Motor ____
T	**Treatments**	Tubes, Lines (Location and Size), Fluids, Medications and Response, Dressings, Splints Defibrillation / Pacing

- Expanded MIST information will be provided to the receiving facility by the transporting agency. This more detailed note will include the first responder information and shall be documented on a run report for every patient.
- Emergency responders functioning at the BLS level will be expected to conform to LCDPS BLS medical protocols to the extent that their training and certifications allow.
- Following training and successful competency assessment, EMTs are authorized to apply pulse oximetry monitoring devices, perform blood glucose evaluations, perform bag-valve-mask ventilation, and perform bag-valve ventilation of paramedic-inserted endotracheal tubes.
- 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 (DOT) National Standardized Curriculum (NSC), maintain active State certificates, and be credentialed by the system Medical Director.

Refusal of Service and Transport

General Principles of Medical Care

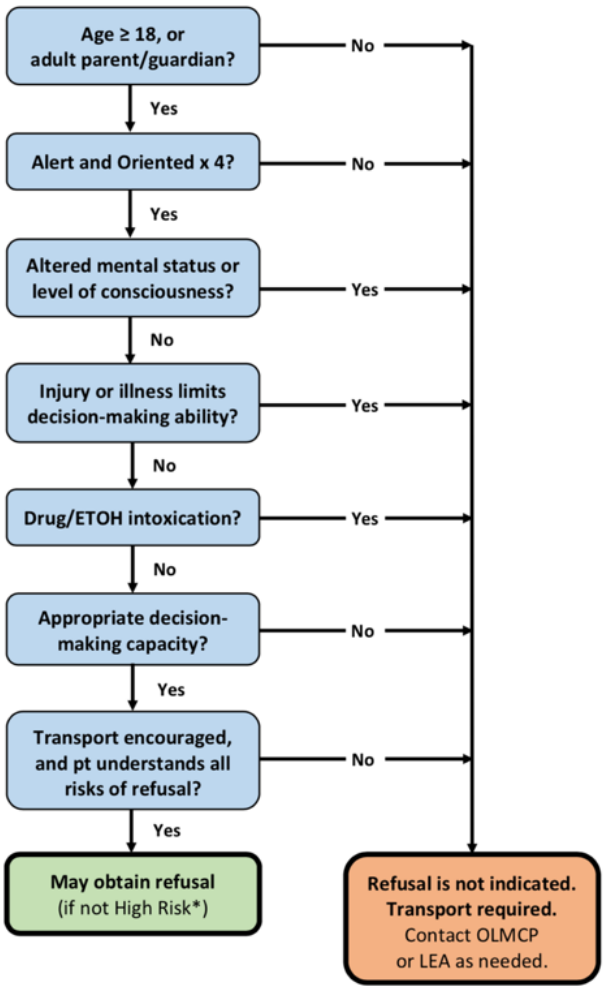
GENERAL GUIDELINES FOR PATIENT REFUSAL OF TREATMENT AND/OR TRANSPORT

- The definition of a patient is any person that:
    a. Has a complaint suggestive of potential illness or injury
    b. Requests evaluation for potential illness or injury
    c. Has obvious evidence of illness or injury
    d. Has experienced an acute event that could reasonably lead to illness or injury
    e. Is in a circumstance or situation that could reasonably lead to illness or injury
    f. Upon discovery of vital signs outside normal values.
    g. If there are any questions or doubts, the individual should be considered a patient
- A patient encounter shall be considered any event when signs and symptoms or a patient complaint results in evaluation or treatment.
- **All patients shall be assessed and offered transport by ambulance to the nearest appropriate hospital, regardless of the nature of the complaint. The assumption should ALWAYS be that the patient requires medical care and transport.**
- If a patient or guardian refuses transport to the hospital, a properly documented refusal process **MUST** be performed. **The refusal process is to be performed by an ALS provider.**
- All patient encounters (regardless of their transport status) require a written run report (this includes **at least two sets of vital signs**). See "Documentation" for more details.

- **To provide "informed consent for refusal" a person must legally be one of the following**:
    a. ≥ 18 years of age
    b. A court emancipated minor
    c. A legally married person of any age
    d. An unwed pregnant female < 18 years old, only for medical issues relating to pregnancy
    e. A parent (of any age) on behalf of their child's medical care only when the refusal of care does not put the child at risk of harm
        i. When parent is unavailable, other adult relatives (e.g., step-parent, adult sibling, grandparent, adult aunt or uncle) may refuse care on behalf of a minor.
        ii. *Consider* involving OLMD in cases where the parent cannot be contacted
- Obtain a **history** from the patient and/or others, obtain **vital** signs, perform a **physical examination** paying close attention to alterations in mental status or vital signs, **consider medical illnesses or trauma** that may represent a threat to life or health
- **Ensure patient understands the risks of refusal, which may include death or disability, and has the ability to voice this understanding back to the EMS provider.**
- Additionally, the patient **must have decision-making capacity** (see "Assessing Decision-Making Capacity")

If the patient meets <u>all capacity requirements</u> (see "Assessing Decision-Making Capacity"):

- Emphasize the need for care, the risks of refusal of care, and our wish to transport the patient
- If patient, parent, or guardian declines care and EMS personnel do not feel hospital transport is required, the patient, parent, or guardian **must sign the written refusal form in front of two witnesses**
- If the patient, parent, or guardian judged to have capacity **refuses** to sign the refusal form:
    a. Reassess the capacity of the individual
    b. If still considered to have capacity, a **verbal statement must be documented** on the run report and the **verbal waiver form completed**
- **Document carefully your refusal process** – patient / parent / guardian's alertness, orientation, presence or absence of alcohol or drug intoxication, evidence or absence of head injury, decision-making capacity assessment, and informed consent for risks of refusal.



If the patient's <u>decision-making capacity is impaired</u>:

- The patient shall be deemed ***medically incapacitated*** and should be transported to the hospital for further assessment and treatment.
- **Paramedics are authorized to transport against the patient's will**, using no unreasonable force
    - Refer to Florida Statute 401.445 for more details ("Florida Statute 401.445" at the end of this section)
    - Explain to the patient (or parent/guardian) the need for transport
    - Reassure the patient that no harm will result from transport but that risks—up to and including death—may result from a delay in treatment
    - If patient, parent, or guardian continues to refuse care, enlist Battalion Captain, OLMD, and/or law enforcement to help secure the patient for transport
- The assessment of medical decision-making capacity must be documented fully.

ASSESSING DECISION-MAKING CAPACITY

- **Decision-making capacity** is a clinical judgment that **must be performed and documented** on every refusal.
- Many conditions can alter decision-making capacity, including intoxication, poisoning, hypoxia, head injury, stroke, infection, and mental illness.
- When conducting the assessment, take the patient's normal baseline into account. The **goal** is to be reasonably certain the patient **understands the risk of refusal and can make an informed decision** at the time they refuse EMS care or transport.

- **In addition to vital signs, all of the following must be assessed and documented**:
  - Orientation: All patients undergoing the refusal process must be awake, alert, and oriented to time, person, place, *and situation* (i.e., A&O x 4). The patient must have no changes in mental status or level of consciousness which may influence their ability to make an informed decision. Even if the patient is at their baseline, failure at this step necessitates transport or involvement of a surrogate.
  - Gait / Coordination: Unsteady gait may indicate an impairment that alters decision-making capacity.
  - Speech Pattern: Slurred, incoherent, or inappropriate speech patterns may indicate an impairment that alters decision-making capacity.
  - Insight and Judgment: The patient must express good insight into the nature of their condition, the risks of refusal, and a reasonable plan to deal with their condition.
  - Evidence of Psychiatric Decompensation: Determine if the patient is experiencing suicidal or homicidal thoughts, hallucinations, thought disorders, or other mental illness that may alter capacity.
  - Illness or injury: **The patient must have no signs of injury/illness which may limit the ability to make an informed decision**. **If they are medically unstable, this becomes a high risk refusal.**
  - Intoxication: The patient must have no clinical signs of intoxication by alcohol or drugs (licit or illicit).

PEDIATRIC REFUSALS

In pediatric refusals, the assessment lies in the decision-making capacity of the parent / custodian, while taking into consideration the well-being of the child. The goal is to be reasonably certain the parent / custodian can make an informed decision at the time they refuse EMS care or transport.

- Emphasize the need for care, the risks of refusal of care, and our wish to transport the patient
- Every effort will be made to transport minors if they exhibit any findings of injury, alteration in mental status, or intoxication. Contact OLMD if there are any concerns.
  - If a parent / custodian refuses medical care for a minor when there is reasonable concern that the decision poses a threat to the well-being of the minor:
    - Contact OLMD for physician input
    - Enlist the aid of LEO for patient and crew safety
    - If an immediate life-threatening condition exists, transport the patient to the nearest appropriate ED
- If the parents or guardian are not on scene, they may make the refusal over the telephone. Two witnesses must confirm the telephone conversation by both signing the waiver form.
- If no parent or guardian is available, and there are reports or findings of injury or illness, intoxication, and/or alterations in mental status, level of consciousness, or vital signs, the minor will be transported.
- It is recommended to call OLMD for pediatric refusals.

HIGH-RISK REFUSALS

It is recommended to call OLMD for pediatric refusals.

The following scenarios require OLMD contact prior to completing the refusal process:

- Patients < 1 year old
- Trauma with significant mechanism
- Intoxicated patients
- Abnormal vital signs
- Mental health concerns
- Status post EMS treatment (seizure, asthma, hypoglycemia, Narcan) – see "Refusal of Transport after Treatment Given" for specific guidelines
- **Paramedic discretion** – If the patient, after evaluation by EMS, is judged to be at risk of suffering from a **serious illness or injury**, refusal of care **must involve OLMD**.
- In the event a parent or custodian refuses medical care for a minor when there is reasonable concern that the decision poses a threat to the well-being of the minor:
    - Contact OLMD for physician input
    - Enlist the aid of LEO for patient and crew safety
    - If an immediate life-threatening condition exists, transport the patient to the nearest appropriate ED

Contact with **OLMD** for patients refusing care is helpful in many ways. Patients often decide to consent after they hear your consultation with **OLMD**, and you can ask **OLMD** to speak directly with the patient. Even if the patient refuses, the call records the patient's own voice on the recorded line as additional documentation of your sincere efforts to provide informed consent and to encourage the patient to seek medical care.

REFUSAL OF TRANSPORT AFTER ALS INITIATED

Contact OLMD for refusal situations that arise after advanced life support (ALS) has been initiated.

- Exceptions to this requirement are:
    - Bronchospasm resolved after nebulizer treatment (see "Refusal of Transport after Treatment Given")
    - Insulin-induced hypoglycemia resolved after glucose (oral or IV) administration (see "Refusal of Transport after Treatment Given")

DISCONTINUATION OF REFUSAL PROCESS

There are six situations where efforts to obtain consent from the patient may be discontinued:

1. Patient decides to consent
2. Patient's level of consciousness deteriorates to the point that they are no longer able to refuse care
3. Patient demonstrates appropriate decision-making capacity and undergoes a fully documented refusal process involving informed consent (see above)

4. Patient continues to refuse, physical restraint with LEO assistance is needed, LEO refuses to assist (document), and OLMD approves discontinuation of efforts
5. Patient has left the scene and efforts to detain the patient would be inappropriate or dangerous
6. Contact with OLMD has occurred

OTHER SITUATIONS

- If EMS is summoned by a *third party* and either (1) the patient is not found, or (2) no EMS assistance is required, there is "No Patient Found" and no refusal form is required
    - **If patient contact is made, a patient care report must be completed**
- If a citizen has called for lift assistance, the paramedic must complete a full assessment on the citizen for any traumatic injuries, alterations in mental status, or other concerns
    - If none are found, a full citizen assist report shall be documented

FLORIDA STATUTE 401.445

Florida Statute 401.445 Emergency examination and treatment of incapacitated persons.—
(1) No recovery shall be allowed in any court in this state against any emergency medical technician, paramedic, or physician as defined in this chapter, any advanced registered nurse practitioner certified under s. 464.012, or any physician assistant licensed under s. 458.347 or s. 459.022, or any person acting under the direct medical supervision of a physician, in an action brought for examining or treating a patient without his or her informed consent if:
(a) The patient at the time of examination or treatment is intoxicated, under the influence of drugs, or otherwise incapable of providing informed consent as provided in s. 766.103;
(b) The patient at the time of examination or treatment is experiencing an emergency medical condition; and
(c) The patient would reasonably, under all the surrounding circumstances, undergo such examination, treatment, or procedure if he or she were advised by the emergency medical technician, paramedic, physician, advanced registered nurse practitioner, or physician assistant in accordance with s. 766.103(3).

Examination and treatment provided under this subsection shall be limited to reasonable examination of the patient to determine the medical condition of the patient and treatment reasonably necessary to alleviate the emergency medical condition or to stabilize the patient.
(2) In examining and treating a person who is apparently intoxicated, under the influence of drugs, or otherwise incapable of providing informed consent, the emergency medical technician, paramedic, physician, advanced registered nurse practitioner, or physician assistant, or any person acting under the direct medical supervision of a physician, shall proceed wherever possible with the consent of the person. If the person reasonably appears to be incapacitated and refuses his or her consent, the person may be examined, treated, or taken to a hospital or other appropriate treatment resource if he or she is in need of emergency attention, without his or her consent, but unreasonable force shall not be used.
(3) This section does not limit medical treatment provided pursuant to court order or treatment provided in accordance with chapter 394 or chapter 397.

Patient Name: _____ **Transport Date:** _____

I request that payment of authorized Medicare, Medicaid, or any other insurance benefits be made on my behalf to **Levy County Emergency Medical Services (aka LCEMS)** for any services provided to me by **LCEMS** now, in the past, or in the future. I understand that I am financially responsible for the services and supplies provided to me by **LCEMS**, regardless of my insurance coverage, and in some cases, may be responsible for an amount in addition to that which was paid by my insurance. I agree to remit to **LCEMS** any payments that I receive directly from insurance or any source whatsoever for the services provided to me and I assign all rights to such payments to **LCEMS**. I Authorize **LCEMS** to appeal payment denials or other adverse decisions on my behalf without further authorization. I Authorize and direct any holder of medical information or other relevant documentation about me to release such information to **LCEMS** and its billing agents, the Centers for Medicare and Medicaid Services, and/or any other payers or insurers, and their respective agents or contractors, as may be necessary to determine these or other benefits payable for any services provided to me by **LCEMS**, now, in the past, or in the future. A copy of this form is as valid as an original.
Privacy Practices Acknowledgment: by signing below, I acknowledge that I have received **LCEMS** Notice of Privacy Practices.

Section I – Patient Signature:

X _____ Date _____

Witness if the patient signs with an "X" or other mark. (This can be an ambulance crew member).

X _____ Date _____

Section II – Authorized Representative Signature:

Reason the patient is physically or mentally incapable of signing. _____

Authorized representatives include only the following individuals (check one):

- ☐ Patient's Legal Guardian
- ☐ Health Care Power of Attorney
- ☐ Relative or other person who receives government benefits on behalf of patient
- ☐ Relative or other person who arranges treatment or handles patient's affairs
- ☐ Representative of an agency or institution that furnishes care, services or assistance.

I am signing on behalf of the patient and recognize that signing is not an acceptance of financial responsibility for the services rendered.

X _____ Date _____
Representative Signature

Section III – Ambulance Crew and Receiving Facility Signatures:

Complete this section **ONLY** if: (1) the patient was physically or mentally incapable of signing, **AND** (2) no authorized representative (see Section II) was available or willing to sign on behalf of the patient at the time of service.

Ambulance Crew Member Statement (must be completed by crew member at time of transport):

My signature below indicates that, at the time of service, the patient named above was physically or mentally incapable of signing, and that none of the authorized representatives listed in Section II of this form were available or willing to sign on the patient's behalf. My signature is not an acceptance of financial responsibility for the services rendered.

REASON patient incapable of signing: _____
Name and Location of Receiving Facility: _____ Time at Receiving Facility: _____

_____ _____ _____
Signature of Crew Member Printed Name Date

Receiving Facility Representative Signature:

The patient named on this form was received by this facility at the date and time indicated above. My signature is not an acceptance of financial responsibility for the services rendered to this patient.

_____ _____ _____
Signature of Receiving Facility Representative Printed Name Date

Section IV – Transport and/or Procedure Refusal

__**Transport Refusal**; I _____, (Patient or Guardian) have been informed of the reason I should go to a hospital for further medical care, and have been informed of the consequences and/or complications that may result in my (or my guardians) refusal to go to the hospital for further emergency care; and, as a competent adult, fully understand all of the above and am capable of determining a rational decision on my behalf; and, have been advised that emergency medical care is necessary, and that refusal of recommended care and transport to a hospital may result in death or imperil my/the patient's health by increasing the opportunity for morbidity. Nevertheless, and understanding all of the above, I (or my guardians) refuse to accept emergency medical care or transport to a hospital facility, assume all risks and consequences resulting from my (or my guardians) decision, and release Levy County from any and all liability resulting from my (or my guardians) refusal.
__**Procedure(s) Refusal**; I _____, (Patient or Guardian) have been informed by the attending Paramedic and/or EMT of Levy County EMS of treatment(s) that they deem necessary. I understand my condition could be seriously worsened depending on my illness or injury as a result of refusing treatment(s). I hereby refuse the treatment(s) suggested and release Levy County of any liability due to my decision.

_____ _____ _____ _____
Patient's Signature Date Witness Date

_____
Paramedic or EMT Signature

Refusal of Transport after Treatment Given

General Principles of Medical Care

The *high-risk refusal criteria* supersede this protocol. If a patient has any high-risk refusal criteria, OLMD should be contacted (refer to "Refusal of Service and Transport").

BRONCHOSPASM RESOLVED AFTER NEBULIZER TREATMENT

After treatment of bronchospasm, and return to an asymptomatic state, some patients will refuse transport. 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.
- Not initially hypoxic (SpO_2 < 90%)
- No pain, sputum, fever, or hemoptysis
- Significant improvement after a single nebulizer treatment, with **complete resolution of symptoms**
- Vital signs within normal limits after treatment given (Temp, BP, HR, RR, $etCO_2$, and SpO_2 all must be documented)
- Additional considerations:
    - A family member / caregiver should stay with the patient and assist if relapse occurs
    - Ensure the patient understands transport has been offered and subsequently refused. The patient should follow up with their physician as soon as possible and / or call 911 if symptoms recur.
    - Have the patient sign the refusal form in front of two witnesses.

INSULIN-INDUCED HYPOGLYCEMIA - RESOLVED

This protocol applies **only to insulin-dependent** diabetic patients who are refusing hospital transport after the resolution of *insulin-induced hypoglycemia* by the administration of oral glucose or intravenous dextrose. After correction of blood sugar 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 oral diabetes medication**)
- The presentation is consistent with hypoglycemia:
    - Rapid improvement, and **complete resolution of symptoms**, after correction of blood sugar (awake, alert, oriented x 4 post-treatment and understands the current situation)
    - Documented low glucose reading pre-treatment, normal glucose reading post-treatment
    - **Vital signs within normal limits** after correction of blood sugar (Temp, BP, HR, RR, SpO_2, and BGL > 70)
    - There is no indication of an intentional overdose or dosing error
    - No other underlying medical or trauma conditions requiring treatment at the time of service
- Additional patient safety measures that should be considered:
    - A family member or caregiver should be available to stay with the patient and assist for the next 1-2 hours if symptoms recur
    - Ensure the patient understands that transport has been offered, and subsequently refused
    - Inform the patient to follow-up with their physician as soon as possible
    - Inform the patient to re-contact 911 if symptoms recur
    - Have the patient sign the refusal form in front of two witnesses.
- If the above items are accounted for, a properly executed refusal can be accepted from the patient or custodian without contacting OLMD

Transfer of Care (on scene)

General Principles of Medical Care

A two-tier EMS response is designed to provide minimum response times to the maximum area and/or population. To be effective there must be a prompt initial assessment by the first response agency, a rapid but appropriate treatment, and a smooth transfer of patient care to the transport agency.

- The first responder will perform an initial assessment and initiate appropriate treatment immediately.
- Upon arrival at a scene where patient care is being rendered by an initial EMS responding crew, 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.
- Prior to the transfer of patient care between crews, the EMT/paramedic rendering initial care should directly interface with the EMT/paramedic assuming care, to ensure all pertinent information is conveyed.
- If additional care is necessary due to the critical nature of the patient, the transporting paramedic will request continued assistance en route to receiving facility.

- Air Medical Services (Helicopter EMS) offer rapid transport of patients who require time-sensitive care to specialty hospitals (e.g., Trauma centers, Stroke centers, STEMI centers) and can also allow for expanded patient care options due to an expanded skill set, equipment, and formulary.
- Appropriate utilization of air medical services can improve patient care; however, inappropriate utilization of air medical services can delay time-sensitive care.

MANAGEMENT

- Determine potential need for aeromedical transport of the patient. Criteria that suggest the need for aeromedical transport may include, but are not limited to:
  - Need for ALS services where none are available or will be significantly delayed
  - Mass casualty incidents
  - Prolonged extrication
  - Insufficient numbers of EMS personnel, equipment, or vehicles to manage a multiple casualty incident or a single patient encounter
  - Traffic conditions or geographic terrain that prohibits adequate ground access and care to the victim
  - Patient has suffered:
    - Crush injuries to the hand or foot
    - Injuries that may require significant neurovascular surgery
    - Injuries that may require extensive cosmetic surgical procedures
  - Situations in which the time differential between air and ground transport may substantially impact the outcome of the patient (e.g., **STEMI ALERT**, **STROKE ALERT**, **TRAUMA ALERT**).
  - **SEPSIS ALERT** patients that are stable should be transported by ground; unstable **SEPSIS ALERT** patients requiring vasoactive medications, intubation, etc. may benefit from air transport.
  - Patients who meet the **TRAUMA ALERT** criteria as specified by the Florida Administrative Code 64J-2 and in whom the time differential between air and ground transport may substantially impact the outcome of the patient

- The paramedic in charge of the patient is responsible for determining if aeromedical transport is warranted. The paramedic should notify Levy County Dispatch of the need for aeromedical transport as soon as possible in order to minimize response and transport times. First responding units or LEO should be utilized for securing the Landing Zone (LZ) once patient care is assumed by an ALS unit. The paramedic in charge should also request assistance from other agencies as needed to help secure the incident site and LZ.

- If initial indications are that air transport may be required, *the closest available aircraft* should be contacted as soon as possible for dispatch to the scene. The air transport should be allowed to progress towards the scene to decrease response times.

- Should aircraft availability preclude the closest aircraft from being available (e.g., weather, in-service on another call, maintenance), the next closest aircraft should be contacted, regardless of affiliation with the closest aircraft.

- A rendezvous with the aircraft at a predetermined LZ can be utilized if the patient is packaged and ready for transport while the aircraft is en route.

- Guidelines for LZ preparation are as follows:
  - Area should be at least 125 ft. x 125 ft. (day or night), on fairly solid ground, level, free of overhead obstruction, ground obstructions, people, and any material which might fly loose. If there are obstructions, inform helicopter crew via radio. THE HELICOPTER PILOT MAKES THE FINAL DETERMINATION FOR A SAFE LANDING ZONE (LZ).
  - The LZ should be at least 100 ft. away from any patient care activities if the patient is not in the back of an ambulance.
  - The maximum acceptable ground slope is 5 degrees.
  - Mark the four corners of the LZ with lights.
  - The best way to mark the landing position in the LZ at night is to use two vehicles with low headlights ON, shining across the LZ with the intersection of the beams at the landing point. Turn headlights OFF after landing.
  - Do not shine lights directly at the aircraft.
  - Keep spectators at least 200 ft. from the touchdown area and emergency personnel at least 100 ft. away. Do not allow anyone to approach the helicopter after landing.
  - The LZ Safety Officer should be clearly identified day or night with either an orange vest or traffic control flashlight and must be wearing eye protection. The LZ Safety Officer should have radio contact with the helicopter via the LZ VHF channel when applicable and is responsible for directional information.
  - Once the patient is packaged and ready to load, the helicopter crew may select 2 or 3 personnel to assist loading. When approaching or departing the helicopter, be aware of the tail rotor. Remain low at all times and follow the crews' directions for safety.

ADDITIONAL INFORMATION / SPECIAL CONSIDERATIONS

- If an air medical service must turn down a flight request due to weather at the scene or at the receiving hospital, then the patient should be transported by ground.

- If an air medical service turns down a flight request due to weather local to their base or weather between the base and the scene, another flight program may be able to fulfill the request. If a second flight program is requested, they should be notified that the first program turned down the request due to weather.

Physician / Nurse on Scene

General Principles of Medical Care

Occasions will arise when a physician on the scene will attempt to assist prehospital care. The physician who offers assistance at a scene call is doing so for reasons of humanity. A professional and respectful attitude toward the physician / volunteer will be maintained at all times.

The on-scene physician must be willing to accept the following conditions:

- Provide documentation of his / her status as a physician (copy of Florida medical license) (MD or DO)
- Assume full responsibility for patient outcomes related to his / her oversight of patient care
- Agree to accompany the patient during transport (if deemed necessary)
- All interactions with physicians on the scene must be well documented in the Patient Care Report, including the physician's name and contact information

Determine whether the physician is asking to assist care or assume command:

- **Assistance** - the physician wishes to assist the paramedic but not take over command.
  - In this situation, the paramedic remains in command
  - The physician acts as either an extra set of hands, as a resource for procedures selected by the paramedic (e.g., endotracheal intubation), or both
- **Command** - scene command may be granted ONLY if:
  - The physician agrees to sign the narrative section (at the bottom right corner of the run report), accompany the patient to the hospital, and take full responsibility for patient outcomes
  - OLMD is contacted and relinquishes responsibility of patient care to the on-scene physician
  - Orders provided by the physician should be followed unless, in the judgment of the paramedic, they endanger the patient. The paramedic will request the physician to attend the patient during transport if the suggested treatment varies significantly from standing orders.
  - <u>If the physician's care is judged by the paramedic to be potentially harmful, the paramedic should:</u>
    - Politely voice his or her concerns and immediately contact OLMD and your battalion captain. IMMEDIATELY place the on-scene physician in contact with OLMD for resolution of the problem
    - If the conflict remains unresolved, follow the directives of OLMD
    - If the physician on scene continues to carry out the intervention in question, offer no assistance (but provide no resistance) to the physician performing this care, and enlist aid from LEO

Licensed nurses present at an emergency scene who wish to participate in administering care must function in accordance with Florida law (F.S. 401 and F.S. Chapter 464).

Levy County Department of Public Safety
Office of the Medical Director

Thank you for your offer of assistance.

1. These EMTs and Paramedics are operating under the authority of Florida Law and Levy County Protocols developed by the County Medical Director. No physician or other person may assume command of patient care without the Medical Direction Physician on duty relinquishing responsibility for patient care / treatment via radio or phone.
2. If responsibility is given to a physician on scene, that physician is personally liable for any and all care provided on scene, and must accompany the patient(s) to the hospital and sign the patient care report.

All transported patients will be secured to the stretcher with three (3) straps, one of which must be the torso/waist restraint.

The following situations shall require more than one attendant in the back of the ALS unit:

- Medical or trauma cardiac arrest or post-resuscitation care
- Patients requiring active airway assistance (e.g., endotracheal tube, SGA, or BVM)
- Imminent delivery of a fetus
- For scenarios not covered above:
    - If LCDPS requests a 2nd attendant in the back of the ALS transporting unit, a 2nd attendant should accompany the patient
    - A 2nd attendant is not required if there will be an unacceptable delay in transport

- Definition: An on-line emergency physician who is willing to accept responsibility for the actions of EMS personnel.
- Contact: If needing to deviate from, receive clarification for, or modify the CLINICAL TREATMENT PROTOCOLS, the following sequence will be utilized to receive orders:
    a. University of Florida Associates / LCDPS Medical Director via ShandsCair Dispatch (352-265-0222). This is **strongly preferred**.
    b. Receiving facility physician where the patient will ultimately be transported. This should not occur if contact has already been made with OLMD and orders given.
- The above contact information is intended to be utilized to receive further information or orders from a physician.
    a. If a physician has been contacted and orders are given contrary to the request, it is not prudent to contact another physician to attempt to countermand the previous orders.
- Documentation: Provide contact name, time, orders requested, and orders received on the patient care report (PCR). Also document if unable to contact a particular resource, as justification for contacting the next appropriate physician.
- **State your specific request upfront**, and provide all supporting information to justify the request (see "Radio Report"):
    a. Example: "This is Rescue 10 calling to request additional Fentanyl orders. The patient is a 60-year-old male with concerns of a right hip deformity after a fall. He has received 100 mcg of Fentanyl but reports that his pain is 10/10. His vital signs are..."
    b. Level of consciousness (AVPU) and orientation to person, place, time, situation
    c. Chief complaint (HPI, symptoms, pertinent positives, mechanism of injury, pertinent negatives)
    d. Past medical history, medications, allergies
    e. Clinical findings: assessment findings, vital signs, 12 lead ECG
    f. Treatment initiated and patient response
    g. Confirm physician's orders received by repeating information and confirm physician's name

- Complications, problems, or requests for additional orders during treatment will be directed to OLMD.
- Any concerns or issues involving OLMD should be forwarded to the Medical Director for review as soon as possible.

Determination of Hospital Destination

General Principles of Medical Care

Patients may choose their destination emergency department (when operationally feasible), unless the patient is unstable, meets alert criteria, or is unable to make a destination judgment:

- **TRAUMA ALERTS** – refer to "Trauma Alert and Transportation" Protocol.
- Transport all **ALERTS** (STEMI, Stroke, Sepsis, Trauma) to the nearest designated receiving facility for that alert
- Patients whose condition is judged to be **unstable** (high acuity or critical) shall be transported to the closest appropriate hospital-based emergency department
- Transport all post-ROSC cardiac arrest patients to the nearest PCI center
- Transport all LVAD patients to South Tower ED at UF Health Shands Hospital
- If the patient is unable to make a destination judgment, transport to the ED selected by a responsible party acting on their behalf (e.g., parent or guardian), or to the closest appropriate facility

Free Standing Emergency Department (FSED):

All patients are eligible for transport to a free-standing emergency department (FSED), **except**:

- **Alerts** (Stroke, STEMI, Sepsis, Trauma)
  - **Exception:** UF Health Ocala Neighborhood Hospital will accept hemodynamically stable Sepsis Alerts
- **Cardiac arrest**
- **Chest pain** or **shortness of breath**, if any of the following exist:
  - Ischemic EKG changes
    - ST depressions in 2 or more leads, or
    - T-wave inversions in 2 or more leads
  - Known history of CAD, CABG, stents
  - Age > 65 if risk factors are present (e.g., diabetes, hypertension, obesity, hyperlipidemia, smoking in past 3 months, etc.)
- **Unstable** – SBP < 90 or MAP < 65
- **Hypoxia** requiring CPAP/BiPap, assisted ventilations, or **not** relieved by 6 L of O_2
- **GCS < 13** or unable to follow commands
- **Violent** patient or **Baker** acted patient – except as needed for crew safety
- **Obvious need for surgical intervention** or emergent dialysis
  - E.g., pulseless / ischemic extremity or femur deformity
- If a patient will **only** accept EMS transport if allowed to go to a specific FSED, transport to that FSED.

Pregnant patients:

- Pregnant and meeting **TRAUMA ALERT** criteria, refer to "Trauma Alert and Transportation" Protocol.
- Pregnant and en route to UF Health Shands Hospital:
  - If < 20 weeks gestation, transport to South Tower (Adult ED)
  - If ≥ 20 weeks gestation, transport to North Tower (Pediatric ED):
    - Notify UF Health L&D and Pediatric ED charge nurse of OB patient arrival
    - Security will be available at the Pediatric ED to escort EMS to the patient transport elevators and to the 3rd floor L&D
    - L&D charge nurse will meet with EMS, advise appropriate room number, and assume transfer of care

Pediatric patients:

- Transport the patient to the ED of the parent's or guardian's choice, unless the patient meets **TRAUMA ALERT** criteria
- If the pediatric patient meets **TRAUMA ALERT** criteria, transport to the UF Health South Tower ED

Special considerations:

- No paramedic is to influence the patient's choice of hospital, nor assume that a given hospital cannot offer its usual range of services, thereby preferentially re-routing patients to select facilities.
- However, paramedics may educate patients requesting information regarding their specific type and acuity of emergency, and related hospital services available, consistent with recognized local practice.

For patients requesting transport from one hospital ED to another due to prolonged wait times:

You may inform the patient that you will instead assist them back to the present facility if ALL of the following are true:

- The patient is currently in or within 250 yards of the hospital facility
- The hospital facility considers them to be a current patient (checked in / registered)
- The hospital facility can provide the requisite level of care for the patient's complaint
- You have measured vital signs and performed an appropriate assessment
- Vital signs are within normal range

Emergency Department Bypass:

The only complete hospital bypass is a result of:

- Hospital disaster (e.g., fire, power failure, HAZMAT incident, flooded ED, etc.), or
- Security lockdown (armed and dangerous subject in the ED)

- EMS bypass may only be initiated by authorized LCDPS officials (hospital designee request approved by the LCDPS System Chief or Medical Director).
- EMS bypass is a courtesy granted by LCDPS to provide the ED temporary relief from incoming EMS patients. Any hospital on EMS bypass status must notify LCDPS when the ED has been re-opened.
- EMS crews will make every effort to honor the EMS bypass status, except for:
    - Patients whose condition is **unstable**, life-threatening, or deteriorating may be taken to the closest appropriate facility, regardless of bypass status. The paramedic attending the patient, not the hospital, is the sole arbiter of the patient's status (whether stable or unstable).
    - The **patient insists** on transport to a facility on bypass, or a responsible party insists on their behalf
    - Contact OLMD as needed for assistance
- If two or more receiving facilities request bypass status at the same time, all bypasses will be terminated.

Radio Report

General Principles of Medical Care

For all EMS transported patients, radio contact should be made with the receiving facility at least 5 minutes prior to arrival to provide general patient information and estimated time of arrival:

- Select the appropriate receiving facility talk-group on the 800 Mhz radio.
- Listen before transmitting to determine if the talk-group is in use; the system does not allow for two radios to transmit on the same talk-group at the same time.
- Include the following information when calling in radio report to the appropriate facility and/or OLMD:
    - Agency name and unit ID number
    - Alert type if applicable (e.g., trauma, STEMI, stroke, sepsis, etc.)
    - Patient's age and gender
    - Patient's chief complaint and time of onset
    - Brief history relevant to the chief complaint / illness, medications used, allergies
    - Vital signs (as appropriate for circumstances)
    - Mechanism of injury for trauma patients
    - General appearance, including GCS
    - Pertinent physical findings
    - Treatment rendered and response to treatment
    - Request for orders needed and confirmation of any orders given
    - Estimated time of arrival (ETA)

If the transporting paramedic is occupied treating an unstable patient, an abbreviated report may be given by the paramedic or driver to the facility as soon as possible (at least 5 minutes prior to arrival). Include at least the following:

- Estimated time of arrival (ETA)
- Chief complaint
- Age and gender of patient

If the receiving facility cannot be reached:

a. Attempt contact by phone via the use of a recorded line at ShandsCair Dispatch (352-265-0222)
b. Route a message through your battalion captain
c. Follow protocols as written

Transfer of Care (Destination)

General Principles of Medical Care

There may be difficulties in transferring patient care at area hospitals due to overcrowding, the high volume of EMS calls, and the increased severity of illness of patients. It is therefore imperative that we all work together with a spirit of cooperation in order that patients receive the best possible care.

The following procedures will be applied to the transfer of patient care at destination:

- To assure all pertinent information is conveyed to the hospital staff, crews should interface with the charge nurse within 2 minutes of arrival to give a verbal report. Transporting personnel shall provide the receiving facility with any available patient identification, as well as all pertinent incident and patient care information at the time of transfer. In addition to the abbreviated report required by the Florida Administrative Code, turn over all prehospital 12 lead ECGs to the ED staff.
- Once on hospital property (ED, Cath Lab, etc.), the receiving facility assumes responsibility for all further medical care delivered to EMS transported patients. The patient is the responsibility of the hospital and staff whether or not official patient transfer has occurred (EMTALA and CMS S&C-06-21).
- LCDPS personnel are not authorized to follow prehospital protocols after arrival at an ED, and LCDPS Medical Direction should not be contacted for orders.
    a. Exceptions to this should occur only in the following circumstances:
        i. Life-threatening situations such as cardiac arrest, airway emergencies, or imminent delivery of a fetus
        ii. Continuation of treatments started prior to arrival (e.g., nebulizers, CPAP/BiPap, IV fluids)
        iii. When specifically instructed to continue care by the ED physician (when possible, document the physician's name and time verbal order was given)
- Any medications or procedures in progress will be continued until finished unless discontinued by direction of an attending hospital physician. Any new or repeat medications or procedures will be done under the direction of the attending hospital physician using hospital supplies and medications.
- If there is a significant change (deterioration) in patient condition, the hospital medical staff must be informed immediately. Please document the person, title, and time contacted.
- If any conflict in the above procedure arises, immediately notify the Battalion Captain.

- An EMS patient care report will be generated at the conclusion of all patient encounters.
- If time does not permit completion of the entire report, at a minimum, an abbreviated report must be left and the full report forwarded to the receiving facility once completed within the 24-hour time constraint (FAC 64J). An abbreviated report shall sufficiently identify in writing: the crew, patient, vital signs, chief complaint, treatment, and the times observations were made or treatment was rendered (FAC 64J).
- No copies or patient information will be given to anyone other than those covered by Florida Statute and other applicable laws, without written permission from the patient or their surrogate.
- The written report must include thorough documentation describing the situation, physical assessment findings, the chief complaint, vital signs, treatment or care rendered, reactions noted, and disposition of the patient, including any instructions given.

Interfacility transport requires unique skills and capabilities, both in clinical care and operational coordination. Adhere to the following standards for all interfacility transports:

- Interfacility transport decisions (including staffing, equipment, and transport destination) should be made based on the patient's medical needs
- Before transports are initiated, coordination between hospitals and interfacility transport agencies is essential, to ensure that patient care requirements do not exceed the capabilities of the patient attendant
- The sending facility will also provide any necessary equipment, medication, and/or qualified APPROPRIATE personnel in the event that patient care dictates it for transport.
- If EMS crew members are not capable of managing devices or medications that must be continued during transport, an adequately trained care provider from the transferring facility **must** accompany the patient during transport.
- Upon patient contact, the lead ALS provider will complete a thorough patient assessment. From this evaluation, the paramedic will make the determination as to whether the patient meets criteria for either emergent or non-emergent transport. On the occasion that the sending facility physician and the transporting paramedic disagree on the transport status of the patient, the LCDPS Medical Director will make the final decision utilizing information provided by the sending facility physician and the transporting agency paramedic.

- GENERAL ASSESSMENT AND SUPPORTIVE CARE as indicated.
- Suspected child or elder abuse is a serious situation that needs to be recognized and reported for the safety of the patient.
- Know the subtle findings which may alert you to potential abuse. Remember, abuse not only includes physical and sexual abuse, but also neglect and emotional abuse.
- Make mental notes. Note environment, patient's interaction with caregivers, discrepancies in the history obtained from patient and caregivers, and any signs of obvious injury. Document thoroughly.
- If parents / guardians refuse to let you transport the patient, leave scene and remain in a safe location until aid from law enforcement can be enlisted.
- Transport. It is mandatory to report your suspicions to the ER physician upon arrival.
- Do NOT delay transport to obtain information.
- Do NOT make accusatory, confrontational, angry, or threatening statements to any parties present.
- Contact your Supervisor and then notify Department of Children and Families (DCF) (800) 96A-BUSE. ALL PARAMEDICS AND EMTS ARE LEGALLY BOUND TO CONTACT DCF IN ALL SITUATIONS THAT ARE SUSPECTED TO INVOLVE CHILD AND ELDER ABUSE AND NEGLECT. Record the DCF operator's name on run report documentation.
- Carefully document history and physical exam findings, as well as environmental / circumstantial data on the run report.

Baker Act / Marchman Act

General Principles of Medical Care

The Florida Mental Health Act of 1971 (**Baker Act**) allows involuntary examination of individuals presenting with:

- A mental illness (as defined in the Baker Act) and
- Who are a harm to self, harm to others, or at risk for self-neglect (as defined in the Baker Act)

This examination must be performed within 72 hours. Individuals who can initiate a Baker Act include:

- Judges
- Law enforcement officers
- Physicians
- Mental health professionals

Marchman Act:

A Florida Statute that allows for voluntary or involuntary assessment of anyone suspected of being under the influence of drugs or alcohol, and because of this, has lost the power of self-control with respect to substance use and is a danger to themselves or others. This act is filed with the court system.

The LCSO or Law Enforcement Agency (LEA) will transport all Baker Act and Marchman Act patients to a designated receiving facility unless an exception listed below is present:

- The patient is undergoing a medical emergency which requires the treatment abilities of an EMS unit
- The patient has a physical limitation which precludes the transportation by law enforcement vehicle, such as being confined to a stretcher or unable to sit

For patients under an involuntary Baker or Marchman Act requiring transport by EMS:

- If the transferring facility provides a patient advocate, the advocate will be responsible for the enforcement of the Baker / Marchman Act during transport
- If the transferring facility does NOT provide a patient advocate, determine if the patient presents the crew with an imminent threat or an appearance of violent behavior

For concerns of violence or other dangers to the EMS crew:

- Contact LCSO for assistance with securing the patient for transport and protecting the crew
- If the patient has to be restrained by LEO (handcuffs or other means) to be transported by EMS, the LEO may need to ride with EMS to provide access to the patient if the patient becomes unstable
    - EMS WILL NOT TRANSPORT PATIENTS IN THE “HOGTIE” OR “HOBBLE” POSITION
    - This can cause asphyxia and will not be tolerated
- Should the paramedic feel threatened or uncomfortable from the patient’s imminent violent behavior, they may request that LEO ride with EMS for security for the crew
    - LEO will contact their shift commander to determine if it is necessary for LEO to ride with or follow EMS
    - If the patient becomes violent and LEO is following, stop transport and have LEO ride with EMS
    - If LEO refuses to ride with EMS, contact the Battalion Captain for direction
- In the rare event of an immediate life threatening condition, where waiting for LEO would cause serious injury or death of the patient, the EMS crew will notify their Battalion Captain and request personnel from additional units until there is sufficient man-power to mitigate any possible threat posed by the patient, should they become combative

If the patient under a Baker / Marchman Act attempts to escape / elope:

- The EMS crew is NOT to enforce the restraint order, and should the patient seek to exit the vehicle, it will be up to law enforcement to secure the patient
    - Law Enforcement will then re-evaluate the patient to see if the patient still meets Baker Act involuntary examination criteria
    - If the patient does meet criteria, he/she will be transported by EMS to the designated facility

Transporting patients under Baker / Marchman Act to a facility outside of Levy County:

- Transferring facility shall provide a bonded law enforcement officer to maintain the Baker / Marchman Act provision
- If the facility refuses to provide this agent, the EMS crew will contact the Battalion Captain, who will refuse the transfer if the facility is unable or unwilling to supply a security agent
- LCDPS will provide return transportation for the security agent as long as the time constraints are deemed reasonable

Refer to Florida Statute 401.445 for those patients not qualifying for Baker / Marchman Act but who do not have capacity to make rational decisions (see "Refusal of Service" and "Florida Statute 401.445").

MANAGEMENT

A Mass Casualty Incident (MCI) is defined as any event that overwhelms the resources of the EMS system. The need for an organized and orderly approach to an MCI cannot be overemphasized. In such an event, an incident command system should be implemented.

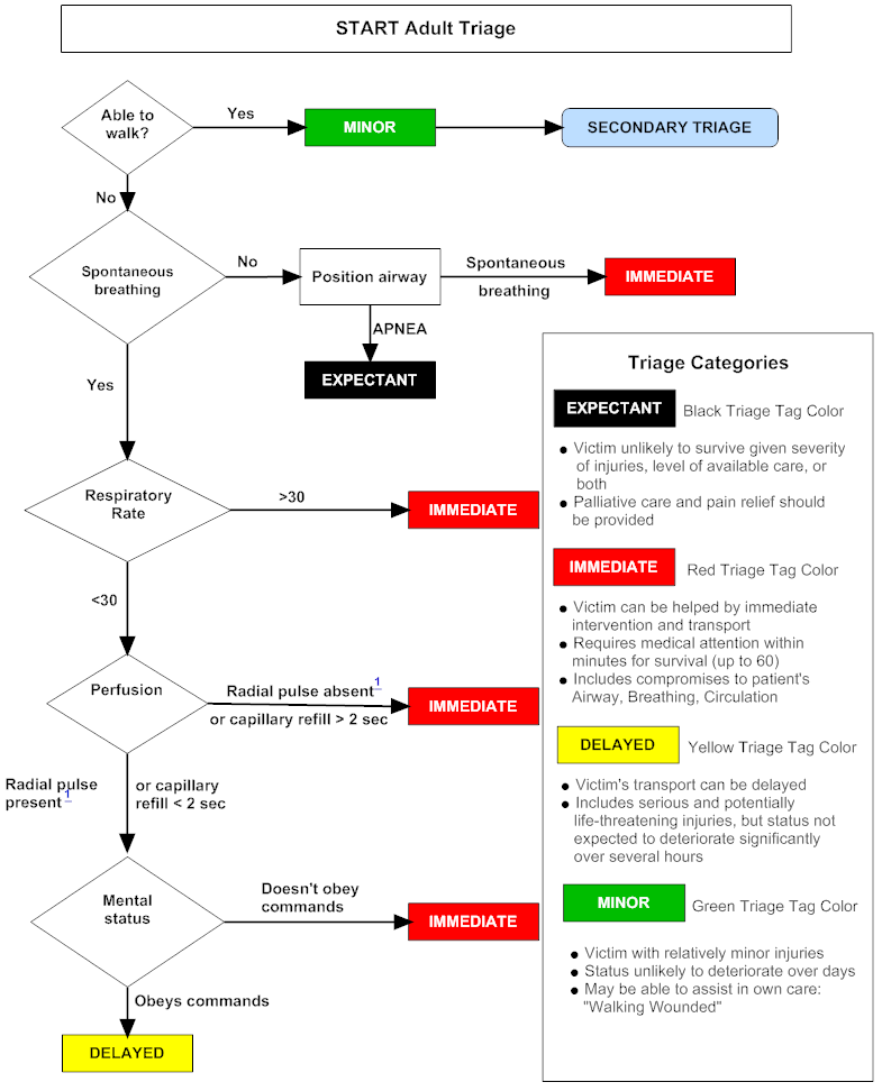
Basic Life Support

- If > 5 critical patients are on scene, notify dispatch immediately of MCI and an estimated number of victims
- Begin triaging patients according to START / JUMPSTART triage system
- Assist ALS provider in triage, treatment, and movement of patients
- Patients' injury / illness severity will be identified as one of the following four categories:
    - Black (Dead) – Not transported
    - Red (Immediate) – Requires immediate intervention and transportation
    - Yellow (Delayed) – Requires intervention and transportation, but this can be delayed for a few hours
    - Green (Minor) – Ambulatory "walking wounded" with minor injuries
- Coordination of patients with area hospitals must be accomplished through the incident command system

The steps of the **START triage system** are as follows:

1. STEP ONE: Loudly ask anyone within the sound of your voice to move to a designated area if they are able. This will automatically help you sort out the walking wounded and these patients should be tagged Green (Minor).
2. STEP TWO: In an orderly fashion, move to each patient checking for the status of Airway, Breathing, Circulation, and Mental status and tag them using the following rules
    - **BREATHING**:
        - **Yes**: if respirations > 30, triage Red (Immediate)
        - **Yes**: if respirations < 30, then check circulation
        - **No**: open and clear airway. If breathing begins, triage Red (Immediate)
        - **No**: after clearing the airway, if the patient is not breathing, triage Black (Dead)
    - **CIRCULATION** (Check pulse):
        - Control bleeding
        - **Weak/absent** pulse OR Capillary Refill > 2 seconds: control bleeding, triage Red (Immediate)
        - **Strong** pulse AND Capillary Refill < 2 seconds: go to mental status check
    - **MENTAL STATUS** (Follows commands "open your eyes", "squeeze my hand," etc.)
        - **Fails to follow** simple commands: triage Red (Immediate)
        - Patient **follows** commands: triage Yellow (Delayed)

During triage, only correct immediately life threatening problems, such as severe bleeding, airway obstruction, sucking chest wound, or tension pneumothorax



SPECIAL CONSIDERATIONS

MCI situations involving **high voltage electricity or lightning** should address **Category Black** patients **first**.

- Scene safety
- Initial care should be provided to **apparently dead victims first**
  - Initiate CPR if indicated
  - Please note: dilated or nonreactive pupils do **not** indicate brain death in high voltage situations.
- Provide spinal immobilization for any patient with high voltage electricity injury
- All patients with high voltage electricity injury require transport to a trauma center for evaluation

PEARLS

It is difficult for healthcare professionals to change their mindset from *saving all patients at any cost*, to *saving the most lives possible* in an event where resources are limited.

With such limited resources in an MCI, healthcare professionals must use this triage process and make decisions on which patients to transport as a priority.

Triage → reassessment → frequent repeat triage leads to the most appropriate decisions.

Section 2. General Approach to All Patients

Medical Assessment and Care

General Approach

TREATMENT PRIORITIES

1. Assessment:
   - SCENE SAFETY / BSI / PPE / Crew safety
   - Primary Survey. Assess the number of patients and additional resources needed.
   - Secondary Survey (when appropriate)
2. Primary Survey:
   - ABCs, unless cardiac arrest
   - If cardiac arrest → CAB, initiate cardiopulmonary resuscitation (CPR)
   - Open **A**irway. Protect c-spine when indicated
   - **B**reathing – Support oxygenation / ventilation
   - Support **C**irculation – Dysrhythmia care? Rate control? Hypotension care?
   - General impression – the overall opinion of the patient's condition / severity
   - AVPU / GCS
   - Early vital signs, get best history (SAMPLE, OPQRST) possible
   - Identify and treat immediate life threats per specific protocol(s)
3. Attempt to limit on-scene time to 10 minutes (*unless working cardiac arrest*)
4. En-route Care:
   - Reassess all primary care
   - Support oxygenation / ventilation
   - Vascular access
   - Secondary Survey (if able)
   - Keep patient warm / avoid hypothermia
   - Early ED notification for patients with time-sensitive conditions (respiratory failure, **STEMI ALERT**, **STROKE ALERT**, **TRAUMA ALERT**)
5. Hospital per destination protocol.

Initial Basic Medical Care E

Maintain patent airway, jaw-thrust, BVM, SpO_2 > 94%
Control bleeding
Vital signs

SAMPLE
OPQRST

Assist pt with pt's own medication if directed by protocol(s)
Determine blood glucose / treat hypoglycemia if any weakness, altered mental status, hx diabetes

EMR / EMT

Paramedic

NPO unless known diabetic patient with hypoglycemia and is able to self-administer glucose E

Clinical Operational Notes

1. Minimize active movement on the patient's part in settings of suspected myocardial ischemia, stroke, and dyspnea.

2. Move and package the patient for transport with safety considerations for all involved.

Advanced airway / ventilator management (if indicated) P

Apply monitor

Obtain 12 lead ECG (when indicated – chest pain, SOB, abd pain above umbilicus, or ischemic equivalent)

Record and monitor vital signs, SpO_2, $EtCO_2$, BGL

IV / IO access (KVO or IV lock)

Fluid bolus (see comments)

Hypoglycemia

Nausea and Vomiting

Medication administration per specific medical protocol(s)

Continuous treatment and assessment per specific medical protocol(s)

If STEMI criteria present: P

STEMI ALERT
Transmit 12 lead ECG to PCI-capable hospital
Expedite transport
"Chest Pain – Suspected Cardiac Ischemia" Protocol

If BGL < 70 mg/dL, refer to "Diabetic Emergencies" Protocol P

***Ondansetron* (Zofran)** P
4 mg slow IV or 4 mg ODT PO
"Abdominal Pain" Protocol

If evidence of dehydration (tachycardia, dry mucous membranes, poor skin turgor) P
→NS 250 mL boluses
→hold at 1000 mL total if no hypotension

If systolic BP < 90 mmHg
→ NS 250 mL boluses until systolic BP > 90 mmHg
Contraindicated if evidence of CHF (e.g. rales)

PEARLS

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

Note: Cardiac arrest is an exception to the A-B-C order. Immediately initiate CPR and search for shockable rhythms at the appropriate intervals (refer to "Cardiac Arrest" Protocols). All witnessed or unwitnessed cardiac arrest patients should have the monitor applied as soon as possible to assess the rhythm, and defibrillate as appropriate. All medical OHCA, including pediatrics, should be worked on scene where the patient is found for 5 cycles of CPR and ALS therapies before the patient is transported or CPR is terminated. If the scene is not safe, or if there is not enough physical room to appropriately work the patient, then move the patient to the closest suitable area possible.

Note: Cardiac arrest due to trauma is not treated by medical cardiac arrest protocols. Trauma patients should be transported promptly with CPR, control of hemorrhage, cervical spine immobilization, and other indicated procedures attempted enroute

Airway:

Assessment

- Evaluate the patency of the airway.
- Is the patient able to oxygenate / ventilate?

Management

- Establish and maintain airway (refer to "Airway Assessment" Protocol). Rapid intervention may be required during the assessment phase if airway patency and protection is compromised.
- Utilize cervical spine precautions when indicated.
- If unable to secure airway by other means and airway is not patent, after all other resources have been exhausted, perform cricothyrotomy ("Cricothyrotomy" Procedure).

Breathing:

Assessment

- Expose the chest as required to assess the mechanics of respiration (taking into account patient privacy / modesty if in public location).
- Note the rate, depth, and pattern of respirations. Note (if any) degree of respiratory distress or effort.
- Auscultate breath sounds bilaterally. Check for decreased breath sounds, JVD, tracheal deviation, and the use of accessory muscles

Management

- Administer the appropriate dosage and route of supplemental O_2 as necessary to alleviate the patient's chief complaint. Keep SpO_2 > 94% and keep the patient's skin pink, warm, and dry. All ALS patients will have pulse oximetry monitored and documented.
- In patients with respiratory difficulties, obtain waveform capnography readings.
- If indicated by ineffective breathing pattern or impaired gas-exchange, assist ventilations, consider NIPPV, provide an airway, and suction as necessary. Following intubation, confirm tube placement by auscultating

the gastric area and the lungs bilaterally, and obtain continuous waveform capnography ("Airway Assessment" Protocol).

- Do not delay transport for multiple attempts at endotracheal intubation. Limit to two attempts prehospital; if unsuccessful, use a supraglottic device (iGel).

Circulation:

Assessment

- The adequacy of a patient's circulation is best assessed -

  First, by evaluating their level of consciousness and mental status (i.e., AVPU, A&O, GCS).
  Next, assess the presence, rate, character, and equality of the pulse.
  Then, check a blood pressure.

Management

- Treat severe external hemorrhage with direct pressure. If applicable, apply a tourniquet. Refer to "Control of External Bleeding" Protocol.
- Apply the cardiac monitor liberally.
- Establish IV of normal saline with macro-drip tubing at KVO or IV Lock system as indicated by patient condition. Micro-drip tubing shall be used for IV infusions for pediatric patients. Attempt an IV insertion twice unless situation demands further repeated attempts. Failure to obtain IV access does not preclude the intervention of other definitive therapy (i.e., IO / IM / IN) if access is needed.
- Inadequate perfusion / Hypotension / Shock: Refer to "Hypotension and Shock" Protocol

Disability:

- Assess distal CSM impairment (Circulation, Sensory, Motor)

Expose:

- Remove clothing as applicable to assess for hidden illnesses or injuries while protecting the patient's modesty

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

Adult GCS					
Motor Response		**Verbal Response**		**Eye Opening**	
Obeys Commands	6	Oriented	5	Spontaneous	4
Localizes	5	Confused	4	To voice	3
Withdrawal	4	Inappropriate words	3	To pain	2
Flexion	3	Incomprehensible sounds	2	None	1
Extension	2	None	1		
None	1				

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

Record blood glucose level if any weakness, altered mental status, or history of diabetes.

Obtain history of present illness or injury, history of past and current medical problems, medications, allergies, and physicians / hospitals used in care plans to help guide further assessment.

Complete a head-to-toe assessment of the patient if the patient is relatively medically stable.

Place patient in position of comfort if not contraindicated.

Once a medication route has been established, administer medication as indicated per Protocols.

Use the cardiac monitor to identify rhythm. If necessary, confirm assessment in another lead to correctly identify the rhythm. Perform a 12 lead ECG on all patients with suspected cardiac or respiratory problems, including, but not limited to, complaints of syncope, near syncope, dyspnea, chest pain, generalized weakness, irregular pulse, and unstable blood pressure (hypotension and hypertension).

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

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

PEDIATRIC CONSIDERATIONS

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

- A Child shall be defined as:
  - **Age ≤ 12 years or weight ≤ 40 kilograms (if age unknown)**
  - **For PALS resuscitation: infant up to puberty**
  - **For Trauma alert: < 16 years**

Basic Life Support

- 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 only in children older than 3 years of age
- Evaluate neurological status, including mental status, pupil reaction, motor function, and sensation
  - For mental status, use the AVPU scale:
    - A- The patient is alert and oriented (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 examination

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
  - Continuously monitor oxygen saturation and capnography
  - If severe symptoms or for medication access, IV 0.9% NaCl 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*** and IV attempts unsuccessful in a child, establish intraosseous access
- If child's condition is critical or unstable, initiate transport without delay
- For patients with severe nausea or vomiting:
  - *Ondansetron* (Zofran), 2 mg (8-15 kg) or 4 mg (> 15 kg) oral disintegrating tablet (ODT) by mouth (break 4 mg tablet in half for 2 mg dose) or slow IV
- Reassess the patient frequently

PEARLS

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

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

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

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

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

3. The following table can be used to calculate Glasgow Coma Scale (GCS) scores in pediatric patients, especially those under 4 years of age. GCS scores for most pediatric patients above the age of 4 years can be calculated using the adult table.

Pediatric Glasgow Coma Scale Scores

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

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

Trauma Assessment and Care

General Approach

TREATMENT PRIORITIES

1. Assessment:
   - SCENE SAFETY / BSI / PPE / Crew safety
   - Primary Survey. Assess the number of patients and additional resources needed.
   - If indicated, **TRAUMA ALERT**
   - Secondary Survey (when appropriate)
2. Primary Survey:
   - **X** – Control arterial bleeding: direct pressure, tourniquet placement
   - **A** – Open airway using jaw-thrust. Protect c-spine when indicated
   - **B** – Seal "sucking" chest wound(s), needle thoracostomy for tension pneumothorax, support oxygenation / ventilation. Supplemental oxygen to maintain $SpO_2 > 94\%$
   - **C** – Initiate cardiopulmonary resuscitation (CPR) if indicated
   - Identify and treat immediate life threats per specific Protocols
3. Secondary Survey:
   - Early vital signs. AVPU / GCS. Undress patient completely, cover with blankets
   - If pregnant → transport in left lateral decubitus position
   - Spinal immobilization when indicated
   - Splint suspected fracture sites (CSM before and after)
3. Attempt to limit on-scene time. **EARLY TRANSPORT**
4. En-route Care:
   - Assess for potential injuries based on mechanism of energy transfer
   - Reassess all primary care
   - Support oxygenation / ventilation
   - Vascular access, permissive hypotension, judicious fluid resuscitation
   - Frequent reassessment. Frequent vital signs.
   - Secondary Survey (if able)
   - Keep patient warm / avoid hypothermia
5. Hospital per destination protocol.

Clinical Operational Notes

1. Move and package the patient for transport with safety considerations for all involved.

EMR / EMT

Paramedic

E

Serious Hemorrhage Control:
Tourniquet (if indicated)
Bandage / Pressure Dressing / Direct Pressure (if indicated) **/ TXA** (if indicated)

Maintain patent airway, jaw-thrust, BVM, $SpO_2 > 94\%$
Support Oxygenation / Ventilation

Vital signs. AVPU.

Cervical / Spinal immobilization (if indicated)
Splint suspected fracture sites

Prevent hypothermia

E

Refer to:
Control of External Bleeding

P

Intubate (if indicated)
Cricothyrotomy (if indicated)
Needle thoracostomy (if tension pneumothorax suspected)

IV / IO access x 2
Fluid bolus (permissive hypotension, judicious fluid resuscitation)

Calculate GCS

Continuous treatment and assessment per specific trauma protocol(s)

PEARLS

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

EARLY TRANSPORT of the critical trauma patient offers the best chance of survival. **Field time should NOT be prolonged** in order to perform procedures not absolutely critical to the well-being of the patient.

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

Primary Survey

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

1. **Traumatic Cardiac Arrest** – Follow Cardiac Arrest –Traumatic Protocol.
2. Control external **hemorrhage**. Any arterial, exsanguinating bleeding should have constant, manual direct pressure or tourniquet placement. Direct pressure must be constant; the provider should not periodically remove pressure / loosen tourniquet to evaluate bleeding / hemostasis. Removal of pressure disrupts clot formation and prevents hemostasis. Refer to "Control of External Bleeding" Protocol.
3. Manually stabilize the **cervical spine** while assessing the **airway** and **level of consciousness**.
    - Cervical spine immobilization is indicated in patients with significant trauma above the clavicles, head injury resulting in AMS, or mechanism of injury that suggests sudden or violent movement of the spine.
    - Airway should be assessed for patency, airway protection, and mechanics.
        - If airway is patent: administer oxygen by most appropriate method
        - If airway is not patent: maintain in-line immobilization, re-position the airway using jaw-thrust maneuver, and suction as needed
        - Reassess the respiratory effort:
            - If adequate, administer oxygen by most appropriate method
            - If unsuccessful, consider placement of oropharyngeal airway to maintain airway patency. Continue cervical immobilization and jaw-thrust maneuver until airway is placed.
            - If intubation is required, utilize manual in-line immobilization or leave cervical collar in place during advanced airway placement. If unable to secure airway by other means and airway is not patent, perform cricothyrotomy ("Cricothyrotomy" Procedure).
    - Ensure there are no signs / symptoms of pneumothorax prior to positive airway pressure.
    - Level of consciousness should be assessed with AVPU and GCS
4. Evaluate **breathing** – Present? Rapid? Normal? Slow? Shallow? Symmetric breath sounds? JVD? Tracheal deviation? Accessory muscle use?
    - Assess for tension pneumothorax (JVD, tracheal deviation, hypotension, unilateral decreased breath sounds, increasingly difficult to ventilate): perform needle decompression ("Needle Thoracostomy" Procedure)

- 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 (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 2nd intercostal space, mid-clavicular line
- In the setting of traumatic cardiac arrest with suspected chest trauma, consider bilateral pleural decompressions as part of the resuscitation efforts

- Record and monitor continuous SpO_2 and $etCO_2$
  - Supplemental oxygen to maintain SpO_2 > 94%. Pulse oximetry for all patients.
- If indicated by ineffective breathing pattern or impaired gas-exchange, assist Bag-Valve-Mask (BVM) ventilations (rate of 12-14 breaths/min with 100% O_2), provide an airway, and suction as necessary. Following intubation, confirm tube placement by auscultating the gastric area and the lungs bilaterally, and obtain continuous waveform capnography ("Airway Assessment" Protocol).
  - If patient is intubated, ventilate to $etCO_2$ of 35 mmHg utilizing continuous waveform capnography.
- Ensure there are no signs / symptoms of pneumothorax prior to positive airway pressure.

5. Evaluate **circulation** – Carotid and radial pulses? Presence? Rate? Character? Skin temperature? Capillary refill? Blood pressure?
   - Direct pressure and / or tourniquet placement for arterial, exsanguinating hemorrhage. Refer to "Control of External Bleeding" Protocol.
   - Establish 2 large bore IV access. IV 0.9% NaCl KVO or IV lock. If patient is unstable with difficult IV access, IO access is preferred.
     - If systolic BP < 90 mmHg, administer boluses of 0.9% NaCl at 250 mL until systolic BP > 90 mmHg
     - Goal systolic BP > 90 mmHg.
   - Consider TXA 2g IV/IO in 100 mL Normal Saline over 5-10 minutes for hemorrhagic shock within 3 hours of injury (refer to TXA Protocol)
   - Perform cardiac monitoring.
   - If evidence of hypotension / shock, refer to "Hypotension and Shock" Protocol.
6. **Expose the patient to conduct an appropriate exam.**
   - Undress patient completely to facilitate a thorough, focused survey
   - Cover with blankets to prevent heat loss and preserve modesty
7. Assess **AVPU**
   - If unresponsive:
     - Immobilize patient with backboard and cervical collar (as indicated)
     - Patient should be immobilized as soon as possible; however, immobilization should not take priority over assessment and management of the XABC's
8. Examine the head for deformity, contusions, abrasions, penetrations, burns, tenderness, lacerations, or swelling ("DCAP-BTLS").
9. Examine the neck for deformity, contusions, abrasions, penetrations, burns, tenderness, lacerations, or swelling ("DCAP-BTLS"), or subcutaneous emphysema.

10. Examine the chest for deformity, contusions, abrasions, penetrations, burns, tenderness, lacerations, or swelling ("DCAP-BTLS"), or paradoxical movement.
    - **Open chest wound** – cover with a gloved hand, place 4x4 Vaseline gauze dressing over wound, and **tape on three sides only.**
    - Flail chest – support chest wall by taping or with manual support.
11. Auscultate the chest for breath sounds in the mid-axilla bilaterally – present? equal?
12. Examine the abdomen and pelvis for deformity, contusions, abrasions, penetrations, burns, tenderness, lacerations, or swelling ("DCAP-BTLS").
13. Examine the extremities for deformity, contusions, abrasions, penetrations, burns, tenderness, lacerations, or swelling ("DCAP-BTLS"), and pulse, movement, sensation (PMS).

Primary survey interventions include XABC's – airway management ("Airway Assessment" Protocol), sealing open chest wounds, needle thoracostomy for suspected tension pneumothorax ("Needle Thoracostomy" Procedure), oxygen administration, and controlling any obvious external hemorrhage ("Control of External Bleeding" Protocol). **Remember to expose the patient as needed to conduct an appropriate exam.**

Any trauma patient with altered level of consciousness, abnormal respiration, abnormal circulation, or signs / conditions likely to lead to shock (distended abdomen, pelvic instability, bilateral femur fractures, etc.) should be rapidly immobilized and transported after completing the primary survey. These are "LOAD & GO" patients. Do not delay transport to perform procedures on scene unless immediately needed to stabilize patient (e.g. airway management, hemorrhage control).

If the patient is critically injured, utilization of the long spine board as a total body splint is a time and resource efficient procedure.

Secondary Survey

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

1. Obtain vital signs (HR, RR, BP, SpO_2).
2. Obtain history of traumatic event and pertinent patient medical history (allergies, medications, past illness / injury, last oral intake).
3. Head to toe exam – look for "DCAP-BTLS" in every body area.
4. Calculate GCS score.
5. Perform indicated bandaging and splinting.
    - Check PMS before reduction / immobilization
    - Femur fractures (closed, mid and distal) may be immobilized with traction splints.
    - Fractures may be immobilized with air splints, ladder splints, or board splints in order to immobilize the joint **above** and **below** the injured area
    - Place cold pack on suspected fracture sites if time and resources allow
    - If distal vascular deficits are noted, reduce fracture in anatomical alignment and splint in most appropriate fashion
    - Recheck PMS after reduction / immobilization

Reassessment Survey

The **reassessment survey** is an abbreviated exam after interventions and completed at least every 5 minutes for critical patients (and approximately every 10 minutes for non-critical patients). The following are the steps of the **reassessment survey**:

1. Notify the receiving hospital early regarding critical patients or those patients meeting **TRAUMA ALERT** criteria
2. Repeat the primary survey
3. Repeat vital signs
4. Repeat GCS score calculation
5. Check every intervention – proper placement of intubation? Proper placement of IV / IO?
6. Check results of every intervention – improved oxygenation / ventilation? Improved blood pressure?

INJURY-SPECIFIC TRAUMA PROTOCOLS

Amputations

Basic Life Support

If partial amputation:

- Place in a dressing moistened with Normal Saline
- Splint in line with associated extremity using bulky pressure dressing
- Avoid torsion or traction of severed part

If complete amputation:

- Apply direct pressure to bleeding sites
- Elevate above the level of the heart as able
- If profuse bleeding despite elevation and direct pressure, place tourniquet just proximal to amputation site. Maintain tourniquet during transport. Do not place tourniquet over joints.
    - Tourniquets are most efficacious if applied prior to shock and notify hospital immediately upon arrival
- Cleanse amputated part with sterile saline.
- Wrap amputated part in a dressing moistened with Normal Saline
- Secure in watertight container/plastic bag and place container in cool water
- Transport amputated part with patient to definitive care facility
- **Note**: Placing the amputated part directly on **ice or a similar environment may further damage the tissue** and prevent its use.

Advanced Life Support

- For isolated extremity trauma:
    - *Fentanyl* (Sublimaze) 1 mcg/kg (max single dose: 100 mcg) slow IV. May repeat after 10 minutes as needed for severe pain (max total dose: 200 mcg)
        - **OR** 100 mcg intranasal via MAD (divide dose equally between nostrils)
        - Contraindicated if systolic BP < 90 mmHg
        - Preferentially use intranasal delivery via MAD for those where IV access may be difficult to obtain in a timely fashion (extremity burns / injuries)
    - Alternative**:** *Morphine* 1 – 5 mg IV
        - May repeat once after 10 minutes PRN (max total dose: 10 mg)
        - Contraindicated if systolic BP < 100 mmHg
    - Alternative**:** *Ketamine* 0.1 – 0.3 mg/kg (max single dose: 30 mg) slow IV (caution when systolic > 160 mmHg)
- For uncontrollable hemorrhage despite aggressive direct pressure with standard gauze:
    - Refer to "Control of External Bleeding" Protocol
    - Notify receiving center of presence and location of the emergency bandage or tourniquet

Burns (Thermal)

Basic Life Support

- Establish patent airway. Use jaw-thrust and bag-valve-mask (BVM) ventilation as needed.
- Supplemental oxygen to maintain SpO_2 > 94%

- Full set of vital signs
- Remove all clothing from patient and expose all burned areas
- Cool compress dressings on minor burns with sterile saline (do not use ice packs)
- Dry, sterile burn sheet on:
    - 2° burns greater than 15% of Total Body Surface Area
    - 3° burns
    - Electrical and chemical burns (chemical burns should be thoroughly irrigated; refer to "Hazardous Materials Exposure: Chemical Burns and Dermal Exposure" Protocol)
- Spinal immobilization if high voltage electrical injuries (> 1000 Volts)
- If burning agent **still in contact** with skin, remove gently after cooling with sterile water or Normal Saline
- If gasoline is present, decontamination is needed prior to entering ED. Alert staff in report that patient will need decontamination on arrival if unable to perform prior to arrival
- If burning agent is **chemical**, brush away any loose, dry agent and irrigate burned area with copious amounts (often multiple liters) of Normal Saline or sterile water
- For **radiation** burns, **decontamination is paramount**. Although invisible, radiation particles can be irrigated away ("like invisible dust") with Normal Saline or sterile water. Record time, distance, shielding, and quantity of exposure. Treat burns like normal thermal burns
- In all cases of fuel, chemical, or especially radiation exposures, avoid recontamination or cross-contamination
- Maintain temperature control by keeping patient warm and wrapped in blankets.

Advanced Life Support

- Patients with known inhalation injury or with signs of potential airway burns (e.g., singed nasal hair, soot in the pharynx, etc.) in respiratory distress should be intubated with the largest endotracheal tube possible
- Assess type, depth, and extent of burn.
- If patient has > 5% total body surface area (TBSA) 2° or any 3°degree burn:
    - IV access – avoid starting lines in burned areas if possible
    - Administer 0.9% NS 1000 mL IV
- Maintain temperature control:
    - Keep patient warm. Wrap in blankets as needed. DO NOT ALLOW PATIENT TO BECOME HYPOTHERMIC
- If moderate / severe pain:
    - *Fentanyl* (Sublimaze) 1 mcg/kg (max single dose: 100 mcg) slow IV. May repeat after 10 minutes as needed for severe pain (max total dose: 200 mcg)
        - **OR** 100 mcg intranasal via MAD (divide dose equally between nostrils)
        - Contraindicated if systolic BP < 90 mmHg
        - Preferentially use intranasal delivery via MAD for those where IV access may be difficult to obtain in a timely fashion (extremity burns / injuries)
        - Use with **caution** in inhalation injuries
    - Alternative**:** *Morphine* 1 – 5 mg IV
        - May repeat once after 10 minutes PRN (max total dose: 10 mg)
        - Contraindicated if systolic BP < 100 mmHg
    - Alternative**:** *Ketamine* 0.1 – 0.3 mg/kg (max single dose: 30 mg) slow IV (caution when systolic > 160 mmHg)

Chest Injuries

Basic Life Support

- 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 sides
    - Remove temporarily to vent air if respiratory status worsens

Advanced Life Support

- Full ALS Assessment and Treatment
- Total amount of IVF should not exceed 1000 mL
- Assess for flail segment and tension pneumothorax
    - Flail chest: support chest wall by taping or with manual support
    - Tension pneumothorax: refer to "Needle Thoracostomy" Procedure
- Observe for signs of impending respiratory failure; Refer to the "Airway Assessment" Protocol if needed:
    - Hypoxia (SpO_2 < 90) not improved by 100% Oxygen
    - Poor ventilatory effort (increasing $etCO_2$)
    - Altered mental status / decreased level of consciousness
    - Inability to maintain patent airway

Crush Injuries

Advanced Life Support

If there is concern for crush injury:

- Administer 1000 mL of NS IV/IO
- Monitor for compartment syndrome
- Administer *Sodium Bicarbonate* 1 mEq/kg IV/IO

Extremity Trauma

Basic Life Support

- Remove or cut away clothing to expose area of injury
- Control active bleeding, refer to "Control of External Bleeding" Protocol
- Check distal pulses, capillary refill, sensation, motor 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 moist sterile dressings
- Dislocations should be immobilized to prevent any further movement of the joint
- Check distal pulses, capillary refill, sensation, motor after splinting

Advanced Life Support

- For isolated extremity trauma:
    - *Fentanyl* (Sublimaze) 1 mcg/kg (max single dose: 100 mcg) slow IV. May repeat after 10 minutes as needed for severe pain (max total dose: 200 mcg)
        - **OR** 100 mcg intranasal via MAD (divide dose equally between nostrils)
        - Contraindicated if systolic BP < 90 mmHg

        - Preferentially use intranasal delivery via MAD for those where IV access may be difficult to obtain in a timely fashion (extremity burns / injuries)
    - Alternative: *Morphine* 1 – 5 mg IV
        - May repeat once after 10 minutes PRN (max total dose: 10 mg)
        - Contraindicated if systolic BP < 100 mmHg
    - Alternative: *Ketamine* 0.1 – 0.3 mg/kg (max single dose: 30 mg) slow IV (caution when systolic > 160 mmHg)
- For uncontrollable hemorrhage despite aggressive direct pressure with standard gauze:
    - Refer to "Control of External Bleeding" Protocol
- For limbs that remain entrapped despite all other extrication attempts, contact Medical Direction to arrange for on-scene medical direction.

Open Fractures

Basic Life Support

- Remove or cut away clothing to expose area of injury
- Control active bleeding, refer to "Control of External Bleeding" Protocol
- Gross contamination, such as leaves or gravel, should be irrigated or removed if possible
- Open wounds/fractures should be covered with moist sterile dressings
- Check distal pulses, capillary refill, sensation, motor prior to splinting
    - If pulse present, splint in position found, if possible
    - If pulse absent, attempt to place the injury into anatomical position
- Check distal pulses, capillary refill, sensation, motor after splinting

Advanced Life Support

- For adult with suspected open fracture:
    - Cefazolin (Ancef) 2 grams IV/IO as infusion over 10 minutes ***or*** slow IV push over 3-5 minutes
        - Reconstitute each 1 gram vial by injecting 2.5 mL NS into each vial
        - Infusion: Withdraw each reconstituted vial with single syringe, dilute in 100 mL NS bag, and administer as infusion over 10 minutes {10 gtt set (100 gtts/min)}
        - **OR** IV Push: Withdraw each reconstituted vial with single syringe, dilute in 10 mL NS, administer as slow IV Push over 3-5 minutes
        - Contraindications: known hypersensitivity reaction to Cephalosporins (e.g. Cefazolin, Cefadroxil, Cephalexin, Ceftriaxone, Cefepime) or anaphylaxis to Penicillins (e.g. Amoxicillin, Ampicillin, Nafcillin)
- Administer analgesic according to "Extremity Trauma" Protocol
- For uncontrollable hemorrhage despite aggressive direct pressure with standard gauze:
    - Refer to "Control of External Bleeding" Protocol

Head Injuries

Airway interventions can be detrimental in patients with head injury by raising intracranial pressure (ICP), 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 SpO_2 > 94% (i.e., NRB, BVM, iGel).

Basic Life Support

- Supplemental oxygen to maintain SpO_2 > 94%
- Restrain as needed
- If Normotensive or Hypertensive, elevate head of backboard 15° - 30°

Advanced Life Support

- Full ALS Assessment and Treatment
- Advanced airway/ventilatory management as needed
    - Observe for signs of impending respiratory failure; Refer to the "Airway Assessment" Protocol if needed
        - Hypoxia (SpO_2 < 90) not improved by 100% Oxygen
        - Poor ventilatory effort (increasing $etCO_2$)
        - Altered mental status / decreased level of consciousness
        - Inability to maintain patent airway
    - For patients with assisted ventilation, administer eucapneic (normal rate 12-15/minute) ventilations with a goal of $etCO_2$ between 35-40 mmHg
- Acute herniation should be suspected when the following signs are present:
    - Acute unilateral dilated and nonreactive pupil
    - Abrupt deterioration in mental status
    - Abrupt onset of motor posturing
- *Hyperventilation* (ventilatory rate of 20/minute) is a temporizing measure which is only indicated in the event of acute herniation
    - If signs of acute herniation develop, increase ventilatory rate to 20/minute with a goal $etCO_2$ between 30-35 mmHg
- For awake patients experiencing nausea or vomiting, administer *Ondansetron* (Zofran), 4 mg slow IV or 4 mg Oral Disintegrating Tablet (ODT) by mouth
- For combative patients secondary to head trauma
    - Ensure hypoxia and hypotension are addressed
    - Apply physical restraints if needed to ensure patient/crew safety
    - If severely agitated despite all other efforts:
        - *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg slow IV
        - Alternative**:** *Lorazepam* (Ativan) 2 mg IV **OR** 2 mg IM
        - Inform receiving facility the patient was given sedating medication

Ocular Trauma

Basic Life Support

- Avoid any pressure on the affected globe
- Avoid bright lights
- Stabilize any penetrating objects. Do not remove any impaled objects
- Prompt eye protection. Protective shield unless impaled object precludes
- If exposed to a chemical agent, emergent decontamination with normal saline (via a Morgan lens if available)
- Prevent patient from bending or straining
- If blood observed in anterior chamber, transport with head elevated 60°

- If patient is being transported for treatment of diagnosed central retinal artery occlusion (CRAO), administer 100% oxygen by nonrebreather.

Advanced Life Support

- Assess the nature of eye emergency – blunt vs. penetrating, chemical, glaucoma (by history), or others
  - Briefly check visual fields and visual acuity
  - Transport with head of bed elevated 60°
  - Note: Trivial injuries to eyelids may hide significant injury to the globe
- Penetrating trauma:
  - Avoid any pressure on the affected globe
  - Carefully secure penetrating objects (do not remove)
  - If possible, cover the affected eye with an eye shield
  - Patch both eyes to prevent conjugate movement
  - Explain to the patient why it is necessary to patch both eyes.
  - If possible, transport patient in supine position
- Blunt trauma:
  - If no contraindications, elevate head of bed
  - Avoid bright lights (dim compartment lights, allow patient to wear sunglasses, keep eyes closed, etc.)
  - Note the ability or loss of ability to move the eyes in any particular direction.
- Chemical trauma:
  - Ask patient to close their eyes while lying flat, administer 2 drops of Tetracaine to the medial aspect of the eye(s) and then ask them to blink. Allow the medication 1 minute to take effect. Place Morgan lens(es) (if available) into their affected eye(s). Begin irrigation throughout transport if the chemical was alkali or acidic agent or if symptoms persist.
  - If Morgan lens is unavailable, may gently irrigate affected eye(s) with Normal Saline directly
  - Dim cabin lights for patient comfort
  - Irrigate affected eye with a minimum of 2 liters Normal Saline, using the Morgan lens (if available)
- If patient is being transported for treatment of diagnosed central retinal artery occlusion (CRAO):
  - This presents as acute painless persistent loss of vision ranging from seeing fingers to only seeing light.
  - Many may describe a prior episode of “Amaurosis Fugax,” which is vision loss described as a curtain falling over the visual field, lasting seconds to minutes, then vision returning to normal
  - Administer 100% Oxygen via non-rebreather
  - Place patient in supine position
  - Transport emergently to the receiving hospital

Pregnant Trauma

- In pregnant females, even a low mechanism of trauma can lead to placental abruption.
- The most common cause of fetal mortality is maternal mortality
- **Treatment of the mother ALWAYS comes first**
- Assess patient for uterine contractions, vaginal bleeding, and amniotic rupture
- Place patient in 15° of left lateral decubitus position to decrease pressure on the mother’s vena cava and increase blood return to her heart
- Support backboard with pillows placed under the right side of the board in the immobilized patient

- If unable to place mother in this position, you may manually displace the uterus to the left to relieve pressure on the vena cava
- Any pregnant female > 20 weeks gestation who has been involved in an MVC > 35 mph, rollover, ejection, steering wheel deformity, or significant mechanism with a high index of suspicion shall be **TRAUMA ALERT** and transported to the trauma center

Sexual Assault

- For victims of sexual assault who meet **TRAUMA ALERT** criteria, transport to State Approved Trauma Center (refer to "Trauma Alert and Transportation" Protocol)
- For all other cases, transport to nearest emergency department
- Provide supportive care as indicated by patient's condition

Spinal Immobilization

- Refer to "Spinal Immobilization" Protocol

Tranexamic Acid (TXA)

General Approach

Pharmacologic Effects

- Anti-fibrinolytic (reduces clot breakdown). Prevents plasminogen from being converted to the enzyme plasmin. Plasmin breaks down existing blood clots by destroying fibrin in a process called fibrinolysis.

Indications

- **IV/IO**
  - Adult Trauma Alerts in hemorrhagic shock within 3 hours of injury with evidence of significant active hemorrhage:
    - Systolic BP < 90 mmHg
    - Pulse rate > 110 beats per minute
    - Tachypnea > 24 breaths per minute
    - Evidence of peripheral vasoconstriction including cool, pale skin and delayed capillary refill of > 2 seconds
  - Immediately postpartum patients in hemorrhagic shock with evidence of significant active hemorrhage
- **Topical**
  - Persistent external bleeding
- **Nebulized**
  - Massive hemoptysis

Contraindications

- None in emergent situations
- Age < 16 for IV/IO formulations
- Time from initial traumatic insult > 3 hours or unknown injury time
- Non-traumatic hemorrhagic shock (Exceptions: postpartum, hemoptysis, epistaxis, intraoral)

Caution

- **IV/IO formulation is not indicated for:**
  - Patients < 16 years
  - Gastrointestinal bleeding (medical)
  - Intracranial bleeding
  - Minor or controlled bleeding
- **Pregnancy Category C**
  - May be used in pregnancy for the indications described above

Adverse Reactions

- Hypotension – especially if rapid IV push
- Possible increased risk of thromboembolism with IV route (DVT and pulmonary embolism)
- Anaphylaxis

Dosage

- **IV/IO**
  - **2 gram slow IV/IO push** once

        - **<u>Recommend</u>**: Administer in 100 mL Normal Saline over at least 5 minutes, preferably over 10 minutes

- **Topical**
    - **1 gram** to soak gauze pad
        - Apply pressure to wound as needed
    - **1 gram** – sprayed or atomized – to intranasal or intraoral source of bleeding
        - Such as epistaxis or tonsillar bleeding
- **Nebulized**
    - **1 gram** nebulized once for massive hemoptysis
        - May dilute in Normal Saline as needed

Trauma Transportation

Adult & Pediatric Trauma Alert Procedure:

- Assess the trauma patient and determine the need for transportation to the State Approved Trauma Center (SATC) using the adult or pediatric trauma criteria:
  - A **TRAUMA ALERT** is to be initiated immediately when an adult or pediatric trauma patient is determined to meet the adult or pediatric trauma alert criteria
  - Patients meeting **TRAUMA ALERT** criteria will be transported to the nearest available SATC
  - All **TRAUMA ALERT** patients **< 16** years of age will be transported to the Level I Pediatric Trauma Center at UF Health
- Once a **TRAUMA ALERT** has been initiated, contact the receiving facility and provide initial notification that a Trauma Alert patient will be transported or is en route:
  - Give agency name, unit number, brief description of injury, estimated time of arrival
    - Be specific as to the actual **TRAUMA ALERT** criteria when possible
  - Use the term **TRAUMA ALERT** to avoid any confusion
- When en route, the transporting crew will re-contact the SATC and provide a full radio report, as outlined in the "Radio Report" Protocol
- The transporting agency will provide a completed Patient Care Report to the hospital staff upon delivery of patient to the SATC
- Trauma Alert patients may also be transported to the nearest emergency department (other than a State Approved Trauma Center) when the following conditions exist:
  - Unmanageable airway emergencies
  - Logistical failures that make transport to SATC impossible

Transport Mode

- The route (air or ground) that enables the patient to arrive at the trauma center in the shortest time shall be used
- **Traumatic cardiac arrest is a contraindication to initiating helicopter transport**
  - An exception to this principle is when the arrest occurs during the transition of the patient to the helicopter (this may include transport in a ground unit to the landing zone)

State Approved Trauma Centers

• Ocala Regional Medical Center	Level II	1431 SW 1st Ave, Ocala
• UF Health	Level I (Adult and Pediatric)	1515 SW Archer Rd, Gainesville

Emergency Interfacility Transfer of Trauma Victims

Patients may occasionally require emergency interfacility transfer from an outlying hospital to a State Approved Trauma Center (SATC). The decision to initiate this level of interfacility transfer is made by the treating physician at the outlying hospital, in coordination with the accepting physician at the SATC.

When this scenario arises, adhere to the following:

- Assess the patient upon arrival, but avoid unnecessary delays in transport
- Transport to the facility at which a physician has accepted the patient; it is the transferring hospital's responsibility to ensure the receiving center has accepted the patient

- If EMS crew members have not received training on and/or are not capable of managing devices or medications that must be continued during transport, an adequately trained care provider from the transferring facility must accompany the patient during transport

Adult Trauma Alert Criteria

The presence of any of the listed items below requires TRAUMA ALERT activation:

- ☐ Meets color-coded triage system (any one RED, or any two BLUE criteria met)
- ☐ GCS ≤ 12 (GCS is a stand-alone criteria, even if color-coded criteria are not met)
- ☐ Transfer patients who have received/are receiving blood products or vasoactive medications (pressors) to maintain vital signs

Component	BLUE Criteria	RED Criteria
Airway	Respiratory rate ≥ 30	Active airway assistance, respiratory compromise[1]
Circulation	Sustained heart rate ≥ 120 with radial pulse	**Any of the following:** • Lack of radial pulse with sustained heart rate ≥ 120 (*traumatic arrest*) • Blood pressure < 90 mmHg
Best Motor Response (Glasgow Coma Score)	BMR of 5	**Any of the following:** • BMR ≤ 4 • Suspicion of spinal cord injury (Paralysis, Loss of sensation)
Cutaneous	**Any of the following:** • Soft tissue injury[2] • GSW to extremity distal to elbow/knee	**Any of the following:** • 2nd or 3rd degree burns > 15% TBSA • Amputation proximal to wrist or ankle (presence of mangled extremity with tourniquet in place to maintain vitals) • Penetrating injury to head, neck, torso[3]
Long Bone Fracture[4]	**Any of the following:** • Single fracture site due to MVC • Single fracture site from fall ≥ 10 feet	Fracture of 2 or more long bones[4]
Age	55 years or older	N/A
Mechanism of Injury	**Any of the following:** • Ejection from a vehicle[5] • Deformed steering wheel[6]	N/A

1. Airway assistance beyond administration of oxygen, including, but not limited to, manual jaw thrust, multiple suctioning, airway adjuncts
2. Major degloving injures or major flap avulsion (> 5 in.)
3. Excluding superficial wounds in which the depth of the wound can be determined
4. Long bones include humerus, radius+ulna, femur, tibia+fibula
5. Excluding motorcycle, moped, all terrain vehicle, bicycle, or open body of a pickup truck
6. Only applies to driver of vehicle

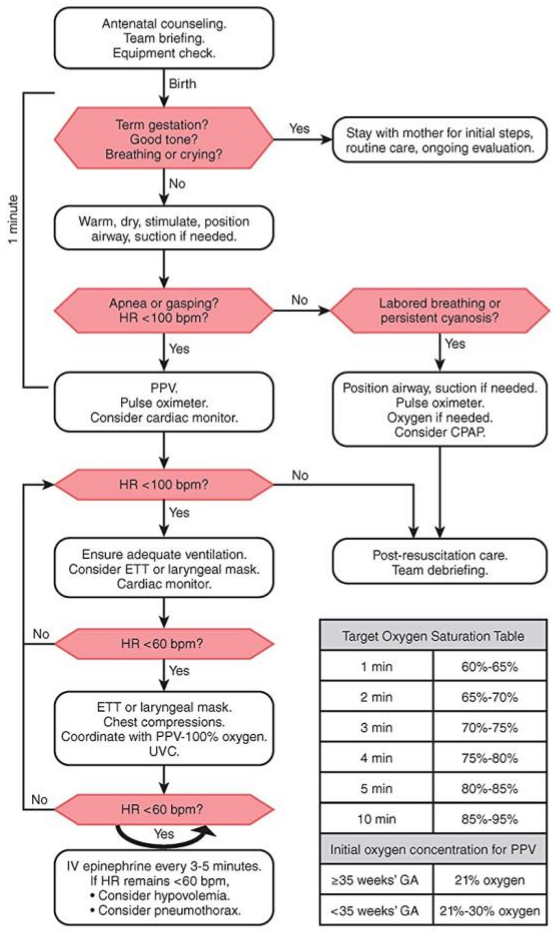
- ☐ Patient does not meet any above criteria but, in the judgement of the paramedic, should be transported as a **TRAUMA ALERT**. Document reason on run report. High-risk features / mechanisms to consider are included below. It is important to emphasize that this is **not** a prescriptive list (meaning, you are **not** required to call a trauma alert based on these criteria, but these are injuries to consider).

_____ High Voltage Electrical Injury (> 1000 volts)
_____ Falls > 12 ft. Adult
_____ Open or depressed skull fracture
_____ Suspected flail chest
_____ Suspected unstable pelvic fracture
_____ Prolonged extrication
_____ Rollover MVC
_____ Death of an occupant in the same passenger compartment
_____ Major vehicle intrusion
_____ MVC with ejection
_____ Automobile vs Pedestrian / bicyclist who is thrown, run over, or if auto was traveling > 20 mph
_____ Ejection from motorcycle, ATV, horse > 20 mph
_____ Blast or explosion
_____ Gestational Age ≥ 20 weeks and one of the following:

- MVC > 35 mph
- MVC rollover
- MVC driver with steering wheel deformity
- Mechanism of Injury (Paramedic discretion)

Neonatal Resuscitation Program®, 8th Edition - Reference Chart

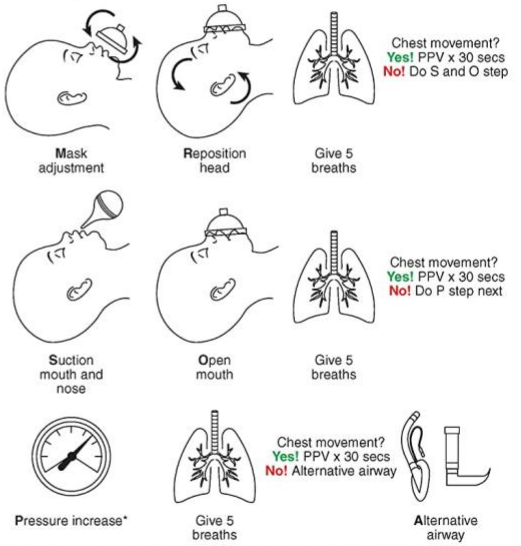
The most important and effective step in neonatal resuscitation is ventilation of the baby's lungs.



Target Oxygen Saturation Table	
1 min	60%-65%
2 min	65%-70%
3 min	70%-75%
4 min	75%-80%
5 min	80%-85%
10 min	85%-95%
Initial oxygen concentration for PPV	
≥35 weeks' GA	21% oxygen
<35 weeks' GA	21%-30% oxygen

Ventilation Corrective Steps (MR. SOPA)

When a MR. SOPA step results in chest movement, ventilate for 30 seconds and reassess heart rate.



* Increase pressure incrementally by 5 to 10 cm H_2O. The maximum recommended pressure is 40 cm H_2O in a term baby.

Endotracheal Intubation

Gestational Age (weeks)	Depth of Insertion at Lips (cm)	ET Tube Size (ID, mm)
23-24	5.5	Size 2.5 < 1 kg or < 28 weeks
25-26	6.0	
27-29	6.5	Size 3.0 1-2 kg or 28-34 weeks
30-32	7.0	
33-34	7.5	Size 3.5 > 2 kg or > 34 weeks
35-37	8.0	
38-40	8.5	
41-43	9.0	3.5-4.0

Shaded table adapted from Kempley ST, Moreiras JW, Petrone FL. Endoracheal tube length for neonatal intubation. *Resuscitation*. 2008;77(3):369–373.

Neonatal Code Medications

Drug	Dose*	0.5 kg	1 kg	2 kg	3 kg	4 kg	Administration
Epinephrine IV/IO Concentration: 0.1 mg/mL 1 mg/10 mL	0.02 mg/kg Equal to 0.2 mL/kg	IV Dose: 0.01 mg Volume: 0.1 mL	IV Dose: 0.02 mg Volume: 0.2 mL	IV Dose: 0.04 mg Volume: 0.4 mL	IV Dose: 0.06 mg Volume: 0.6 mL	IV Dose: 0.08 mg Volume: 0.8 mL	IV/IO rapid push Flush with 3 mL NS Repeat every 3-5 minutes if heart rate less than 60 bpm
Epinephrine ETT Concentration: 0.1 mg/mL 1 mg/10 mL	0.1 mg/kg Equal to 1 mL/kg	ET Dose: 0.05 mg Volume 0.5 mL	ET Dose: 0.1 mg Volume 1 mL	ET Dose: 0.2 mg Volume 2 mL	ET Dose: 0.3 mg Volume 3 mL	ET Dose: 0.4 mg Volume 4 mL	May administer while vascular access is being established ETT rapid push No need for flush. Provide PPV breaths to distribute into lungs.
Normal Saline IV 0.9% NaCl	10 mL/kg	5 mL IV	10 mL IV	20 mL IV	30 mL IV	40 mL IV	Give over 5-10 min

*The recommended dose range for intravenous or intraosseous administration is 0.01 to 0.03 mg/kg (equal to 0.1 to 0.3 mL/kg).
The recommended dose range for endotracheal administration is 0.05 to 0.1 mg/kg (equal to 0.5 to 1 mL/kg).

These suggested epinephrine doses are based on a desire to simplify dosing for educational efficiency and do not endorse any particular dose within the recommended dosing range. Additional research is needed to ascertain the ideal epinephrine dose.

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MANAGEMENT

Basic Life Support

- Note gestational age. Note if twin gestation is known
- Assess for presence of meconium
- Assess breathing or presence of crying
- Assess muscle tone. Assess color
- **Provide warmth** using blankets and cap
- When to suction:
  - Spontaneously breathing, well-appearing infants do NOT require suctioning
  - Infants with obvious obstruction to spontaneous breathing or who require positive-pressure ventilation:
    - Open airway and **suction** with bulb syringe
    - Suction mouth first, then nasopharynx
- Dry, stimulate, and reposition
- Administer supplemental blow-by oxygen as needed
- Evaluate respirations, heart rate, and color:
  - If apnea or HR < 100, provide **ventilations** using BVM and 100% Oxygen (40-60 breaths/min)
  - If HR < 60, begin **chest compressions**
- Note APGAR scores at 1 and 5 minutes after birth, and then every 5 minutes until vital signs have stabilized

Advanced Life Support

- **Provide warmth** using blankets and cap
- If the amniotic fluid contains meconium and the newborn has absent or depressed respirations, decreased muscle tone, or heart rate < 100 bpm:
  - **Suction** any visible meconium from the hypopharynx and airway
  - After suctioning, provide **ventilations** using BVM and 100% Oxygen (40-60 breaths/min)
- If apnea or HR < 100, provide **ventilations** using BVM with 100% Oxygen (40-60 breaths/min)
- Target oxygen saturation after birth:
  - 1 min - 60-65%
  - 2 min - 65-70%
  - 3 min - 70-75%
  - 4 min - 75-80%
  - 5 min - 80-85%
  - 10 min - 85-95%
- If HR < 60, begin **chest compressions**
- Administer boluses of 0.9% NaCl at 10 mL/kg IV
  - If no IV access obtained after 2 attempts or within 90 sec, obtain IO access
- *Epinephrine 1:10,000* 0.1 mL/kg IV if no improvement
  - Repeat *Epinephrine* (same dose) every 3 to 5 minutes if no response
- *Naloxone* (Narcan) 0.1 mg/kg IV/IO, if respiratory depression in a newborn of a mother who received narcotics within 4 hours of delivery
  - Repeat *Naloxone* (Narcan) same dose, as needed
- Administer *D10W* at 5 mL/kg IV/IO; no need to check blood glucose prior to administration

Neonatal Resuscitation

General Approach

PEARLS

In general, approach the resuscitation of the newborn or infant within the first 30 days of life focusing on basic life support interventions. Invasive, advanced procedures are *rarely warranted* and are rarely more effective than simple, yet important, basic interventions.

Note: Cardiac arrest is an exception to the below order. Aggressively initiate chest compressions, while still conserving warmth and initiating supplemental oxygenation / ventilation.

Warmth (Body Temperature Conservation):

Due to high surface-to-body weight ratios, the neonate rapidly loses body heat which can lead to respiratory and circulatory distress.

Keep the neonate warm. Minimize skin exposures unless absolutely warranted during care events.

Airway:

Evaluate the patency and mechanics of the airway.

Is the patient able to oxygenate and ventilate?

Simple positioning intervention may be required during the assessment phase if airway patency and protection are compromised.

Breathing:

Briefly expose the chest as required to accurately assess the mechanics of respiration.

Note the rate, depth, and pattern of respirations.

Note any respiratory distress or effort.

Auscultate breath sounds bilaterally in the axilla to avoid confusing breath sounds from the other side of the chest.

Gentle tactile stimulation (e.g., rubbing of the back, flicking the soles of the feet) may be required early in the assessment and often proves very effective in improving breathing activity.

Obtain pulse oximetry readings. In patients with respiratory difficulties, obtain waveform capnography readings (if equipped with neonatal sized equipment).

Provide blow-by oxygen by 100% NRB as needed:

SpO_2 rises slowly after birth

At 1 minute, SpO_2 goal is 60%. Each minute later, the SpO_2 goal increases by 5%.

At 10 minutes, SpO_2 goal is > 85%.

Adequate respiratory effort

Place infant in slight shock position (supine, legs slightly elevated)

Turn head of infant to side

Poor tone, inadequate respiratory effort, gasping, or apnea after birth:

Position and suction airway

Support ventilations with 100% oxygen via Bag-Valve-Mask ventilation, rate of 40 breaths/min

Keep warm

Assess heart rate and respirations frequently

If spontaneous respirations return and patient has not been intubated, continue to provide blow-by 100% oxygen.

Circulation:

The neonate's circulation is best assessed first by evaluating their level of activity and general body warmth.

Next, assess the rate and character of the brachial pulse. Pulse rates < 100 bpm are abnormal and a cause for concern of impending cardiovascular collapse. Pulse rates < 60 bpm indicate cardiovascular collapse and chest compressions should be initiated.

Brachial pulse < 100 bpm

Assist ventilations with 100% oxygen via Bag-Valve-Mask ventilation

If HR does not improve (< 60 bpm) despite 100% oxygen via BVM

Perform CPR at 120/min.

If oxygen by BVM (no ETT), 3 compressions : 1 ventilation ratio

Reassess after 2 minutes

If HR remains < 60 bpm, continue CPR, perform endotracheal intubation, and ventilations

Obtain vascular access (IV / manual IO)

Fluid bolus: 0.9% NaCl 10 mL/kg IV

Epinephrine 1:10,000 0.1 mL/kg into a manually placed IO.

May repeat *Epinephrine 1:10,000* 0.1 mL/kg IO every 3-5 minutes.

Dextrose 10% (D10) 5 mL/kg IV / IO

Repeat fluid bolus 0.9% NaCl 10 mL/kg IV

Consider *Narcan* 0.1 mg/kg IV / IO / IN

May repeat *Narcan* 0.1 mg/kg IV / IO / IN every 2 minutes as needed, Max: 2 mg

Heart rate improves (> 60 bpm)

Cease compressions

Assist in ventilations as needed

Continue 100% oxygen via BVM or ETT

If patient decompensates at any time, reassess heart rate and assist in ventilations.

After addressing the Warmth-A-B-C order in most neonates, including evaluating and addressing any life-threatening conditions, minimize scene time and initiate timely transport to an appropriate ED

- Record and monitor vital signs.
- Obtain birth and OB history.
- Reassess patients frequently, typically at least every 5 minutes, and more often if critical illness is discovered and being treated. Assess and treat per symptom or illness specific protocols.

SPECIAL CONSIDERATIONS

1. Respiratory distress may or may not look just like adult respiratory distress, presenting with:

slowing or increasing respirations	mottling
accessory muscle use	cyanosis
nasal flaring	pallor
retractions – intercostal or subcostal	lethargy / listlessness
tachypnea	grunting

2. Vital signs vary with age. In general, the younger the patient, the faster the respiratory rate, the faster the heart rate, and the lower the blood pressure. *In most neonates, blood pressure is difficult to measure and often unreliable in attempts to do so in the field. Rather than focus extended time on blood pressure measurements, evaluate perfusion by overall activity level, skin temperature / color, capillary refill (normally < 3 seconds), and muscular tone*.

3. **Thick meconium staining noted** (2015 ACOG update)[1]
   - If the infant is *vigorous* with *good respiratory effort* and muscle tone, the infant may stay with the mother to receive the initial steps of newborn care. Gentle clearing of meconium from the mouth and nose with bulb syringe may be done if necessary.
   - If the infant presents with *poor muscle tone* and *inadequate breathing efforts*, the initial steps of resuscitation should be completed under the radiant warmer. Appropriate intervention to support oxygenation and ventilation should be initiated as indicated for each infant. If the airway is obstructed, this may include intubation and suctioning:
     - Prior to ventilation, infants should be immediately intubated and meconium suctioned through the ETT until no more meconium is present. The infant may then be ventilated with positive pressure as indicated. Failure to clear the trachea before assisted or spontaneous ventilation will disseminate meconium through airways, severely impairing chances for survival.
   - Infants with meconium-stained amniotic fluid should no longer routinely receive intrapartum suctioning; it should be based on their muscle tone and respiratory effort.
   - Warm and dry baby.
   - Assess APGAR at 1 and 5 minutes.

4. APGAR is a quick test performed at **1 and 5 minutes after birth**. The 1-minute score determines how well the baby tolerated the birthing process. The 5-minute score assesses how well the newborn is adapting to the new environment. The rating is based on a total score of 1 to 10, with 10 suggesting the healthiest infant. This test is a screening tool to help determine whether a newborn needs resuscitative efforts.

   Use APGAR scoring at 1 and 5 minutes post-birth, continue every 5 minutes if APGAR < 7:

APGAR Scoring	0	1	2
Appearance	**Blue or Pale**	**Body Pink, Extremities Blue**	**Completely Pink**
Heart Rate (BPM)	**Absent**	**≤ 100**	**> 100**
Grimace (reaction to catheter in nares)	**No response**	**Grimace**	**Cough or Sneeze or Cries**
Muscle Tone	**Limp**	**Some Flexion**	**Active Motion**
Respiratory Rate	**Absent**	**Weak / Slow / Irregular**	**Good / Crying**

0-3 Critically Low ***4-6 Fairly Low*** ***7-10 Generally Normal***

[1] https://www.acog.org/Clinical-Guidance-and-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Delivery-of-a-Newborn-With-Meconium-Stained-Amniotic-Fluid

Airway Assessment and Management

General Approach

MANAGEMENT

Basic Life Support

- Establish patent airway. Use jaw-thrust and/or head-tilt chin-lift as needed
- The airway of a suspected trauma patient should be opened using the modified jaw-thrust maneuver only (AVOID head-tilt chin-lift)
- Supplemental oxygen to maintain SpO_2 > 94%
- Adult patients with a respiratory rate < 12 or > 28 breaths/min and/or exhibiting signs of hypoxemia may require assisted ventilations. Utilizing Bag-Valve-Mask (BVM) and basic airway maneuvers, with supplemental oxygen, deliver enough volume to make the chest rise. If necessary, use two people to get a good seal.
- Pediatric patients with signs of hypoxemia and/or respiratory distress (including bradycardia, abnormal breath sounds, increased work of breathing, nasal flaring, retractions, stridor, or abnormal positioning) should have ventilations assisted with a mask that covers both mouth and nose, but not eyes. This can be accomplished utilizing pediatric Bag-Valve-Mask (BVM) and reservoir with supplemental O_2 at 10-25 LPM.
- Vital signs – BP, HR, RR, SpO_2, BGL, Temperature, $etCO2_2$
- Use suction to clear airway (if indicated)
- Use oral or nasal pharyngeal airway adjuncts (if indicated)

Advanced Life Support

- CPAP/BiPap
- Rapid Sequence Intubation
- Supraglottic Airway
- Endotracheal intubation
- Cricothyrotomy
- Refer to Airway Emergencies – Respiratory Failure

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

Medical Respiratory Arrest:

1. Open airway using head-tilt chin-lift.
2. Oxygenate / ventilate with Bag-Valve-Mask (BVM) with 100% FiO_2.
3. Insert nasopharyngeal airway(s) and/or oropharyngeal airway as needed for patency.
4. Suction as needed.
5. Intubate per applicable protocols using either supraglottic airway or endotracheal intubation.
6. Following intubation, confirm tube placement by auscultating the gastric area and the lungs bilaterally, and obtain continuous waveform capnography.

Trauma Respiratory Arrest:

1. Open airway using jaw-thrust maneuver with another EMS professional applying in-line stabilization of cervical spine.
2. Oxygenate / ventilate with Bag-Valve-Mask (BVM) with supplemental O_2 near 100% FiO_2. **Ensure patient does not have signs / symptoms of pneumothorax prior to positive airway pressure (BVM).**
3. Insert nasopharyngeal airway(s) (only if no head / facial trauma) and/or oropharyngeal airway as needed for patency.
4. Suction as needed.
5. Intubate per applicable protocols using either supraglottic airway or endotracheal intubation.
6. Following intubation, confirm tube placement by auscultating the gastric area and the lungs bilaterally, and obtain continuous waveform capnography.

Medical Respiratory Insufficiency (hypoxemia or hypercapnia or both):

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

Trauma Respiratory Insufficiency (hypoxemia or hypercapnia or both):

1. Establish patency – either spontaneously by patient, patient positioning, or with nasopharyngeal airway(s) (only if no head / facial trauma).
2. Suction as needed.
3. Apply supplemental O_2 by nasal cannula, non-rebreather mask, BVM if patient condition indicates need for oxygenation assist. **Ensure patient does not have signs / symptoms of pneumothorax prior to positive airway pressure (BVM).**
4. Assist ventilations by BVM if patient condition indicates need for ventilation assist. **Ensure patient does not have signs / symptoms of pneumothorax prior to positive airway pressure (BVM).**
5. If actions in steps 1-4 do not achieve needed oxygenation / ventilation AND if licensed as EMT-P, intubate. **Ensure patient does not have signs / symptoms of pneumothorax prior to positive airway pressure (BVM / intubation).**

PEARLS

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

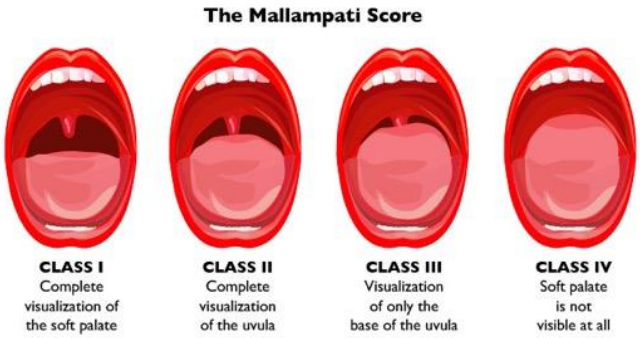
1. Use the *least invasive* method of airway management *appropriate* for the patient.
2. Use a method of airway management with which you are *procedurally comfortable*.
3. Use meticulous *suctioning* to keep the airway clear of debris.
4. *Monitor continuously* to ensure oxygenation / ventilation is as effective as intended and as needed.
5. Understand the difference between these various aspects of airway management:
   - Patency: how open and clear is the airway, free of foreign substances, blood, vomitus, and tongue obstruction?

- Ventilation: the amount of air the patient is able to *inhale and exhale* in a given time, promoting *exchange (blowing off) of **carbon dioxide***. Use **waveform capnography** to measure ventilation.
- Oxygenation: the amount of ***oxygen*** the patient is able to convey to the circulation for tissue / organ perfusion. Use **pulse oximetry** to measure oxygenation.

We would like to promote simple interventions in airway support to prevent further harm. Evidence demonstrates that many times prehospital intubation leads to an increase in morbidity and mortality over BVM, CPAP/BiPap, and supraglottic airway. With long transport times, intubation many times is necessary, but we want to ensure that our focus is oxygenation and ventilation, not placing an endotracheal tube in every case.

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

Look externally (Heavy facial hair? Misshaped or missing dentition?)
Evaluate 3-3-2 (Can at least 3 fingers be placed in the vertical axis of the mouth? Can at least 3 fingers be placed in the space between the chin apex and the top of the neck? Can at least 2 fingers fit between the top of thyroid cartilage and the top of the neck? Three "yes" answers predict lesser anatomical difficulty in establishing intubation.)
Mallampati scoring – see image (view of posterior pharyngeal structures correlates with the anticipated laryngeal view.)
Obstructions (Oral or upper neck masses? Large tongue? Foreign bodies? Anaphylaxis? Angioedema?)
Neck mobility (Unable to assess if concerns of cervical spine injury.)



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

Control of External Bleeding

General Approach

MANAGEMENT

Active bleeding is life-threatening, and prehospital interventions to stop it save lives. Active bleeding must be identified and controlled with high priority.

Basic Life Support

- Consider the following in controlling external bleeding / hemorrhage:
  - Elevation of the injured part above the level of the heart
  - Application of constant direct pressure with a sterile dressing
  - Application of a pressure dressing if the above methods fail
  - Application of a Tourniquet
    - Should be applied early when there is **SEVERE** arterial bleeding present
    - Tourniquet must be at least 2 inches wide **or** an approved commercially available product
    - Apply tourniquet "high and tight". Do not apply over a joint.
    - Tighten tourniquet until bright red bleeding has stopped.
    - Secure in place and expedite transport to Level I Trauma Center
    - Always note time of tourniquet placement and alert receiving facility of time / location of placement
  - **Note**: the key component regardless of selected method is the constancy of pressure application. Direct pressure must be constant; the provider should **not** periodically remove pressure / loosen tourniquet to evaluate bleeding / hemostasis. Removal of pressure disrupts clot formation and prevents hemostasis.
- Establish patent airway, use jaw-thrust and Bag-Valve-Mask (BVM) ventilation as needed
- Record and monitor vital signs
- Supplemental oxygen to maintain SpO_2 > 94%

Advanced Life Support

- Control external bleeding (as described above)
  - Consider TXA 1 gram topical if indicated (refer to TXA Protocol)
- Advanced airway/ventilator management as needed
- Consider TXA nebulized for massive hemoptysis (refer to TXA Protocol)
  - May also consider TXA 1 gram atomized to intranasal or intraoral source of bleeding (refer to TXA Protocol)
- Obtain vascular access (2 large bore IVs if possible)
- If hypotensive:
  - Refer to "Hypotension and Shock" Protocol
  - Consider TXA 2 grams IV/IO if indicated (refer to TXA Protocol)

PEARLS

Studies show considerable increase in survival rate when tourniquets are applied **prior** to the onset of shock.

Section 3. Medical Care Protocols

Abdominal Pain / GI Bleeding / Nausea / Vomiting

Medical Care

MANAGEMENT

Basic Life Support

- Vitals – before and after interventions – BP, HR, RR, SpO_2, BGL, Temperature
- Nothing by mouth. Provide emesis bag or basin to patient (if needed).

Advanced Life Support

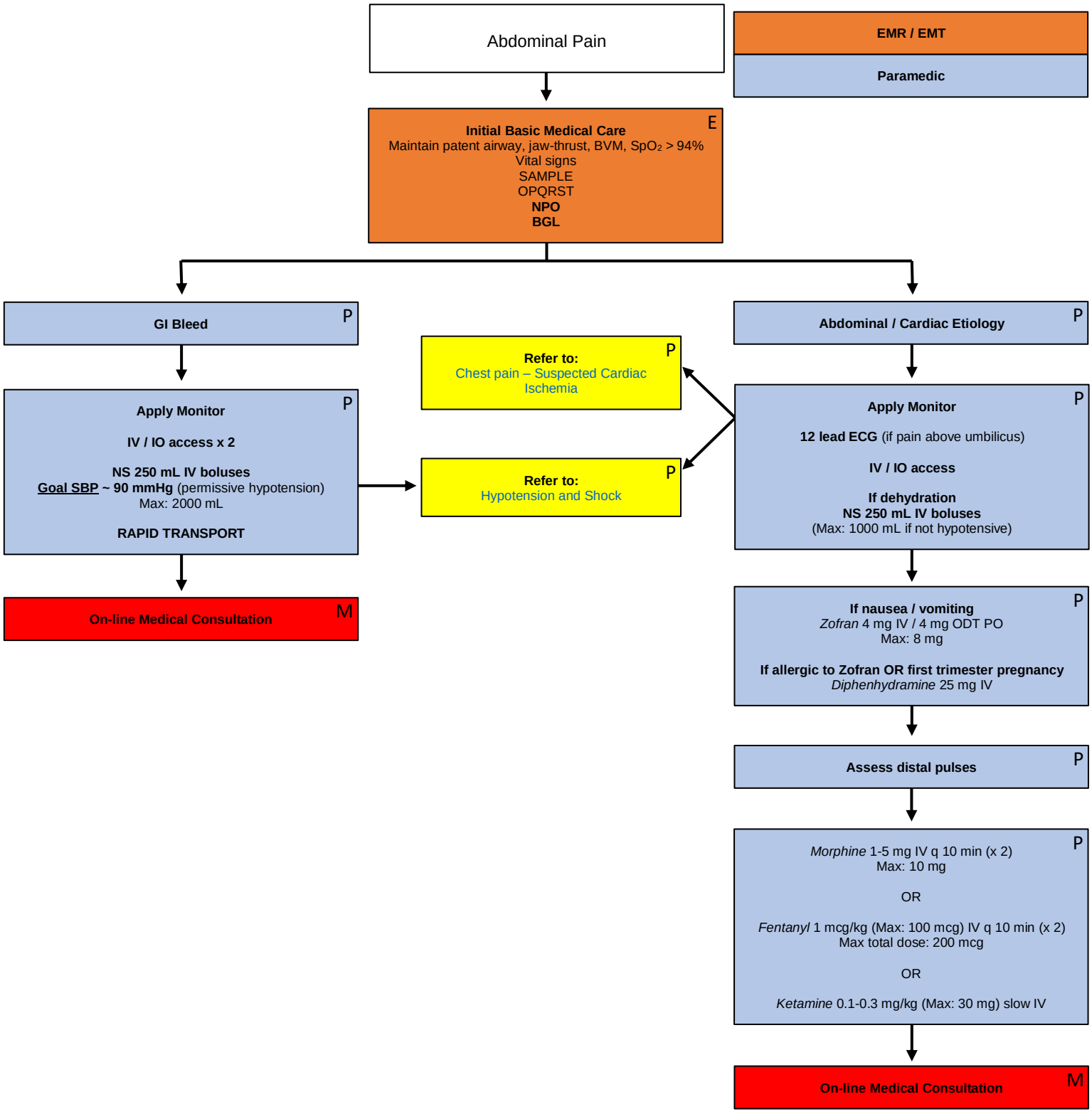
- Airway management – monitor airway for emesis. Ensure they are able to protect airway.
- Vascular Access – 2 large bore IVs suggested
- If pain above the umbilicus, perform cardiac monitoring and **12 lead ECG**. Refer to "Chest pain – Suspected Cardiac Ischemia" protocol.
- IV 0.9% NaCl KVO or IV lock
    - If evidence of **dehydration** (e.g., tachycardia, dry mucous membranes, poor skin turgor), administer boluses of 0.9% NaCl at 250 mL (hold at 1000 mL total if no hypotension).
    - Repeat vital signs after each bolus.
- For patients with **severe nausea or vomiting**:
    - *Ondansetron* (Zofran) 4 mg slow IV **OR** 4 mg Oral Disintegrating Tablet (ODT) by mouth.
        - May repeat once for a max of 8 mg.
    - If allergic to Ondansetron OR first trimester pregnancy (≤ 12 weeks)
        - *Diphenhydramine* (Benadryl) 25 mg slow IV
- Pain treatment
    - *Fentanyl* (Sublimaze) 1 mcg/kg (max single dose: 100 mcg) slow IV/IO; may repeat after 10 minutes as needed for severe pain (max total dose: 200 mcg) **OR** 100 mcg intranasal via MAD (divide dose equally between nostrils)
    - Alternative**:** *Morphine* 1-5 mg IV; may repeat once after 10 minutes PRN (max total dose: 10 mg) if systolic BP > 100 mmHg
    - Alternative**:** *Ketamine* 0.1 – 0.3 mg/kg (max single dose: 30 mg) slow IV/IO (caution when systolic > 160 mmHg)
    - **NOTE**: be aware that treatment of pain can alter a patient's mental status, decrease pain, decrease blood pressure, and lead to a false sense of security by the physician in the ED. Please make sure they are aware of the patient's pain, including level of severity.

Important Considerations

- Abdominal pain emergencies are likely to lead to death through **hypovolemic shock** (either blood loss / hemorrhagic or fluid loss / non-hemorrhagic).
    - If patient presents in shock
        - Administer boluses of 0.9% NaCl at 250 mL (max: 2000 mL). Recheck vital signs after each bolus.
            - If shock is from blood loss, goal systolic BP ~ 90 mmHg (permissive hypotension)
        - Refer to "Hypotension and Shock" Protocol
        - TXA is **not** indicated for GI bleeding and other medical causes of hemorrhage
    - This may also lead to electrolyte imbalances that can cause dysrhythmias. Obtain a 12 lead ECG.
    - Large bore IV x 2

- Assess for orthostatic blood pressure changes if possible.

- **Abdominal aneurysm** should be considered in patients > 50 years old with abdominal / flank pain.
  - Assess for distal pulses



Abdominal Pain / GI Bleeding / Nausea / Vomiting

Medical Care

History	Signs and Symptoms	Differential:
• Age • Past medical / surgical history • Medications • Onset • Palliation / Provocation • Quality (cramping, constant, sharp, dull, etc.) • Region / Radiation / Referred • Pain severity (0-10) • Time (duration, repetition) • Fever • Last meal • Last BM / urination • Blood in stool • Urinary symptoms • Menstrual history	• Pain (location / migration) • Tenderness • Nausea • Vomiting • Diarrhea • Dysuria • Constipation • Vaginal bleeding / discharge	• Abdominal aneurysm • AMI / ACS • Appendicitis • Bladder/prostate disorder/UTI • Bowel obstruction • Diverticulitis • Gallbladder / cholecystitis • Gastroenteritis • GERD • Kidney stone • Liver (hepatitis) • Pancreatitis • Pelvic (PID, ectopic pregnancy, ovarian cyst) • Peptic ulcer disease • Pneumonia, pulmonary embolus

PEARLS

- Abdominal pain has a wide variety of causes ranging from relatively benign to imminently life-threatening. Appropriate assessment is paramount. Possible considerations include:
  - Epigastric pain in older patients and/or patients with risk factors for coronary artery disease could represent a **myocardial infarction/acute coronary syndrome**. These risk factors include age (men > 45, women > 55), hypertension, cigarette smoking, diabetes, hyperlipidemia, hypercholesterolemia, and obesity. Pay close attention to women, diabetics, and the elderly as they may present with atypical cardiac symptoms.
  - Abdominal pain in women of childbearing age should be treated as an **ectopic pregnancy** until proven otherwise. (Ask about LMP, menstrual history, gestation.)
  - Flank pain radiating to the area of the groin may represent **kidney stones**. However, consider **abdominal aortic aneurysm** in patients over 50 with abdominal/flank pain. (Palpate distal pulses to ensure symmetry.)
  - **Appendicitis** presents with vague, periumbilical pain, which migrates to the right lower quadrant over time.
  - Other causes include:
    - GI bleeding (Ask about blood/melena/coffee ground in emesis or stool)
    - DKA (Check blood glucose)
    - Perforated abdominal organs, including ruptured appendicitis, ectopic pregnancy, diverticulitis, etc.
    - Toxic ingestion (including mushrooms and poisons)
    - Intra-abdominal infection and sepsis
- Acute gastrointestinal bleeding is a common and potentially life-threatening source of bleeding that frequently requires hospitalization, and may require blood transfusion. Patients with severe GI bleeding can present in shock, and repeated hematemesis may pose a threat to airway.
  - TXA is **not** indicated for GI bleeding and other medical causes of hemorrhage

Airway Emergencies – Adult Dyspnea

Medical Care

MANAGEMENT

Basic Life Support

- Allow position of greatest comfort (usually sitting up / head of bed elevated)
- Suction oral secretions (if needed)
- Obtain vital signs – before and after interventions – Temperature, HR, RR, BP, SpO_2
- Administer **100% oxygen** via NRB for any patient with respiratory distress
- For inadequate breathing, support ventilation with bag-valve-mask (BVM)

Advanced Life Support

- "Medical Assessment and Care" Protocol
- Apply cardiac monitor, SpO_2, end-tidal CO_2. If possible, apply capnography before treatment, and record strips as treatment progresses.
- Observe for signs of impending respiratory failure; refer to "Airway Emergencies – Respiratory Failure".
    - Hypoxia (SpO_2 < 90%) not improved with 100% Oxygen
    - Poor ventilatory effort (increasing $etCO_2$ not improved with treatment)
    - Altered mental status / decreased level of consciousness
    - Inability to maintain patent airway
    - A patient with severe dyspnea, tachypnea, and normal or high $etCO_2$ levels must be monitored for impending respiratory failure.
- Begin **CPAP/BiPap** if initial symptoms are severe
    - Based on presentation, use manufacturer settings for asthma / COPD or CHF (in general, 7.5 – 10.0 cm H_2O)
    - CPAP/BiPap is contraindicated if systolic BP < 100 mmHg or unconscious / obtunded
    - Brief interruptions to administer medications are acceptable
    - Remove if patient is unable to tolerate CPAP/BiPap mask
- Obtain **12 lead ECG** as soon as possible.
- Obtain IV / IO access
- If blood is filling airway:
    - Consider TXA 1 gram nebulized for massive hemoptysis (refer to TXA Protocol)
    - Consider TXA 1 gram sprayed or atomized for intranasal or intraoral source of bleeding such as epistaxis or tonsillar bleeding (refer to TXA Protocol)
    - IV/IO TXA is **not** indicated

Acute Bronchospasm (wheezing or history of asthma or COPD)

- *Albuterol* (Proventil) 2.5 mg / 3 mL and *Ipratropium Bromide* 0.02% (Atrovent) 0.5 mg / 2.5 mL via nebulizer
    - Repeat *Albuterol* (Proventil) every 20 minutes if wheezing persists
    - Repeat *Ipratropium Bromide* (Atrovent) every 20 minutes if wheezing persists, for a max of 3.
- If moderate or severe respiratory distress:
    - *Methylprednisolone* (Solumedrol) 125 mg IV
- If severe distress or moderate distress not improving with nebulizer:

- *Magnesium Sulfate* 2 grams IV over 10 minutes
- Contraindicated if history of renal failure or MAP ≤ 65 mmHg
- Do not use if CHF suspected

- If severe respiratory distress and wheezing **persists** after above or patient is **unstable**:
  - *Epinephrine 1:1,000* 0.3 mg IM. Should be administered in thigh.
- If bronchospasm worsens despite treatment, respiratory failure may be imminent. Consider the need for CPAP/BiPap, assisted ventilations (BVM), airway adjunct (OPA / NPA), or airway assistance via ETT or SGA (refer to "Airway Emergencies – Respiratory Failure" Protocol).

Acute Pulmonary Edema (history of CHF, pedal edema, JVD, elevated systolic BP)

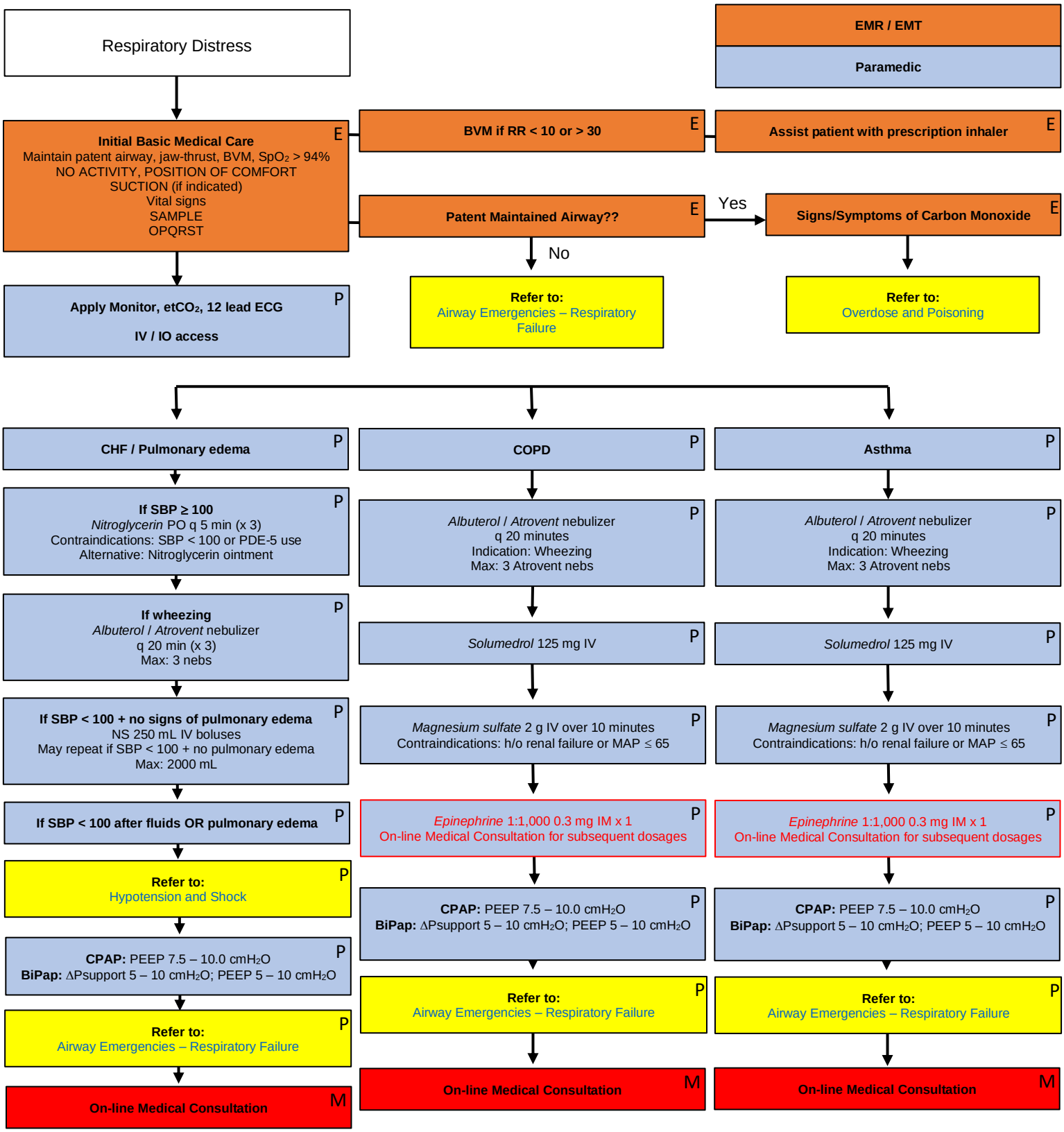
- Obtain IV access and rule out inferior MI (12 lead ECG) first.
- If systolic BP ≥ 100 mmHg
  - *Nitroglycerin* 0.4 mg spray or tablet SL, every 5 minutes
    - Max: 3 doses
    - Contraindicated if systolic BP < 100 mmHg
    - Contraindicated if inferior MI
    - Contraindicated if use of a Phosphodiesterase-5 (PDE-5) inhibitor use within last 24 hours (Viagra or Levitra); 48 hours for Cialis.
    - If patient on NIPPV, use *nitroglycerin* 2% ointment
  - Alternative: *Nitroglycerin* 2% ointment 1.5 inches applied to chest wall. Remove if systolic BP < 100 mmHg. Max: 1 dose. Contraindicated if use of PDE-5 inhibitor or inferior MI.
  - 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
      - Repeat *Albuterol* (Proventil) / *Ipratropium Bromide* (Atrovent) every 20 minutes if wheezing persists. Max: 3 nebs (note **max of 3** nebs in the setting of **cardiac** wheeze)
- If systolic BP < 100 mmHg
  - IV NS 250 mL bolus if hypotensive + no signs of pulmonary edema (repeat up to NS 2000 mL if systolic BP remains < 100 mmHg + no signs of pulmonary edema)
  - If patient remains hypotensive OR signs of pulmonary edema, start *epinephrine* or *dopamine* drip. Refer to "Hypotension and Shock" Protocol. Vasopressor agents must be preceded by cautious fluid boluses (refer to "Hypotension and Shock" protocol).
- Consider the need for CPAP/BiPap, assisted ventilations (BVM), airway adjunct (OPA / NPA), or airway assistance via ETT or SGA (refer to "Airway Emergencies – Respiratory Failure" Protocol).

Drowning

- Spinal immobilization if indicated
- Consider CPAP/BiPap for patients with significant dyspnea or hypoxia
- Protect from heat loss
- Patients may develop delayed onset respiratory symptoms
- Refer to appropriate protocol if cardiac arrest present

Airway Emergencies – Adult Dyspnea

Medical Care



Airway Emergencies – Adult Dyspnea

Medical Care

History	Signs and Symptoms	Differential:
• Asthma • COPD – chronic bronchitis, emphysema • Congestive heart failure • Home treatment (oxygen, nebulizers) • Medications (theophylline, steroids, Lasix, diuretics, inhalers, nebulizers) • Toxic exposure, smoke inhalation	• Shortness of breath • Pursed lip breathing • Decreased ability to speak • Increased respiratory rate and effort • Wheezing, rhonchi, rales, stridor • Accessory muscle use • Fever, cough • Tachycardia	• Asthma • Anaphylaxis • Aspiration • COPD • Pleural effusion • Pneumonia • Pulmonary embolus • Pneumothorax • Cardiac (MI or CHF) • Pericardial tamponade • Hyperventilation • Inhaled toxin - carbon monoxide

PEARLS

- Determine **severity** of dyspnea (moderate vs. severe shortness of breath):
  - **Moderate**: inability to speak full sentences, increased work of breathing, retractions
  - **Severe**: confusion, cyanosis, severe agitation, inadequate respiratory effort

- **Asthma / COPD / Bronchospasm** – A patient with signs/symptoms of acute respiratory distress from *bronchospasm* or *obstructive* airway disease. Additional signs and symptoms may include:
  - Wheezing. Wheezing may be *absent* if patient is unable to move adequate air to generate wheezing (silent chest), which is indicative of *respiratory arrest!* Another way of stating this is – **A patient that is not wheezing does not mean everything is okay; that patient may not be able to move air!** The patient may require epinephrine or assisted ventilations.
  - May have signs of respiratory infection (fever, nasal congestion, cough, sore throat) or acute onset after inhaling irritant.
  - Aggressive use of bronchodilators is the most important therapy for asthma/COPD exacerbation (to reverse bronchospasm)
  - Although sometimes needed, *intubation may further the airway obstruction* in a severe asthma exacerbation (as air may not be allowed to escape), and this may worsen some cases. **Intubated patients with an acute COPD or asthma exacerbation are at high risk for stacked breaths, air trapping, barotrauma, and pneumothorax, and need very close monitoring**.

- **Congestive heart failure** – due to pump malfunction. The heart is unable to provide pump action to meet the needs of the body. This leads to pulmonary edema and respiratory distress. Additional signs and symptoms may include:
  - Rales, wheezing, orthopnea (unable to lay flat), dyspnea on exertion, JVD, lower extremity edema
  - Wheezing could be an early sign of acute pulmonary edema ("cardiac wheezing"). Consider pulmonary edema / CHF exacerbation in patients with wheezing and a significant cardiac history.

- If patients are dyspneic due to an inhaled agent, consult **Poison Control** (1-800-222-1222). Refer to "Overdose and Poisoning".

- The risk in administering nebulized medications involves increased potential for droplet contamination as the patient coughs and exhales. It is advised that all personnel within 3 meters of a patient wear appropriate PPE.

Airway Emergencies – Foreign Body

Medical Care

MANAGEMENT

Basic Life Support

- Perform obstructed airway procedures per BLS standard
  - Patients with partial obstruction (can speak, cough forcefully, cry, or breathe) should NOT undergo advanced maneuvers below
  - For **conscious**, choking ADULTS (cannot cough / cry / breathe), repeat sets of **5 back blows** and **5 abdominal thrusts** until the object is forced out, patient can cry / cough / breathe, or patient becomes unconscious
  - For **unconscious**, choking ADULTS, start **CPR**, open airway using a head tilt/chin lift (if no trauma), look for foreign body, remove if seen
- Administer **100% oxygen** via NRB for any patient with respiratory distress
- Bag-valve-mask ventilate if indicated

Advanced Life Support

- Repeat abdominal/chest thrusts and back blows until foreign object is expelled and airway is cleared or patient becomes unconscious.
- Attempt suction and removal with Magill forceps under direct visualization
- Observe for signs of impending respiratory failure
- If unconscious or unresponsive:
  - Give a series of 30 chest compressions, then inspect for object in mouth prior to attempting breaths
  - If unsuccessful after one series of compressions and ventilations, attempt to directly view object with laryngoscope and remove with Magill forceps
- Alternate attempts to ventilate with airway clearing techniques. Once airway is cleared, support ventilations as needed with 100% oxygen.
- Monitor for signs of hypoxia, cardiac dysrhythmias, and waveform etCO_2 after airway is secured.
- All patients should be encouraged to seek medical attention.
- If the patient is anatomically difficult to intubate (LEMON), refer to "Airway Emergencies – Respiratory Failure" Protocol.

Airway Emergencies – Foreign Body

Medical Care

TREATMENT PRIORITIES

1. Remove obstruction
2. Oxygenation / Ventilation support

EMR / EMT

Paramedic

Airway Obstruction E

Partial

Encourage patient to continue coughing and breathing. E

DO NOT interfere with patient's attempts to expel foreign body.

Continue to monitor patient.

Complete

Conscious

Adults: Heimlich (Abd thrusts if supine) + Back blows E
Pregnant / Morbid obesity: Chest compressions

Unconscious

Adults: CPR E
Pregnant / Morbid obesity: CPR

BVM

Vital signs E
100% oxygen via NRB / BVM if respiratory distress

Apply cardiac monitor P
$etCO_2$

Direct laryngoscopy to visualize
Magill forceps / suction as needed
Removal of foreign body

BVM P
Attempt to ventilate

IV/IO P
Adult: Medication assisted intubation (if indicated)
Pediatric: Medication assisted intubation (if indicated)
Consider Bougie

If unsuccessful, and able to ventilate, attempt P
supraglottic airway device

Adult: Cricothyrotomy for complete, intractable obstruction P
Pediatric pt ≥ 12 yr old: Cricothyrotomy for complete, intractable obstruction
Pediatric pt < 12 yr old: Needle cricothrotomy / jet ventilation for complete, intractable obstruction

Continuous treatment and assessment per specific P
medical protocol(s)

On-line Medical Consultation if persistent obstruction despite above measures M

Airway Emergencies – Foreign Body

Medical Care

History	Signs and Symptoms	Differential:
• Partial obstruction • Complete obstruction • Tracheal stenosis	• Coughing • Cyanosis • Choking sign (hands around neck) • Drooling • Inability to speak or cough • Apparent distress • Anxiety/Stress	• Anaphylaxis • Epiglottitis • Foreign body • Fractured larynx • Peritonsillar abscess

MANAGEMENT

Basic Life Support

- If suspicion of trauma, maintain C-spine immobilization
- Suction all debris, secretions from airway (if needed)
- Supplemental 100% oxygen, then bag-valve-mask ventilate if indicated
- Obtain full set of vital signs including SpO_2

Advanced Life Support

- Monitor $etCO_2$ and SpO_2 continuously
- Follow algorithm (next page) if invasive airway intervention is indicated (ETT or SGA):
  - Apnea
  - Decreased level of consciousness with respiratory failure (i.e., hypoxia [$SpO_2 < 90$] 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
- Effective BVM is an acceptable endpoint
- Place oral-gastric tube via insertion port on SGA; attach to low continuous suction
- ***Attempt cricothyrotomy only after all other ventilation methods have failed***

Peri-intubation physiology

- **Hypotension** and **hypoxia** are extremely dangerous during RSI
- If a patient has SBP < 90 prior to RSI:
  - Use "push dose" epinephrine prior to RSI.
- If a patient cannot be preoxygenated to $SpO_2 > 94\%$ prior to RSI:
  - Must use iGel to prevent peri-intubation hypoxia.

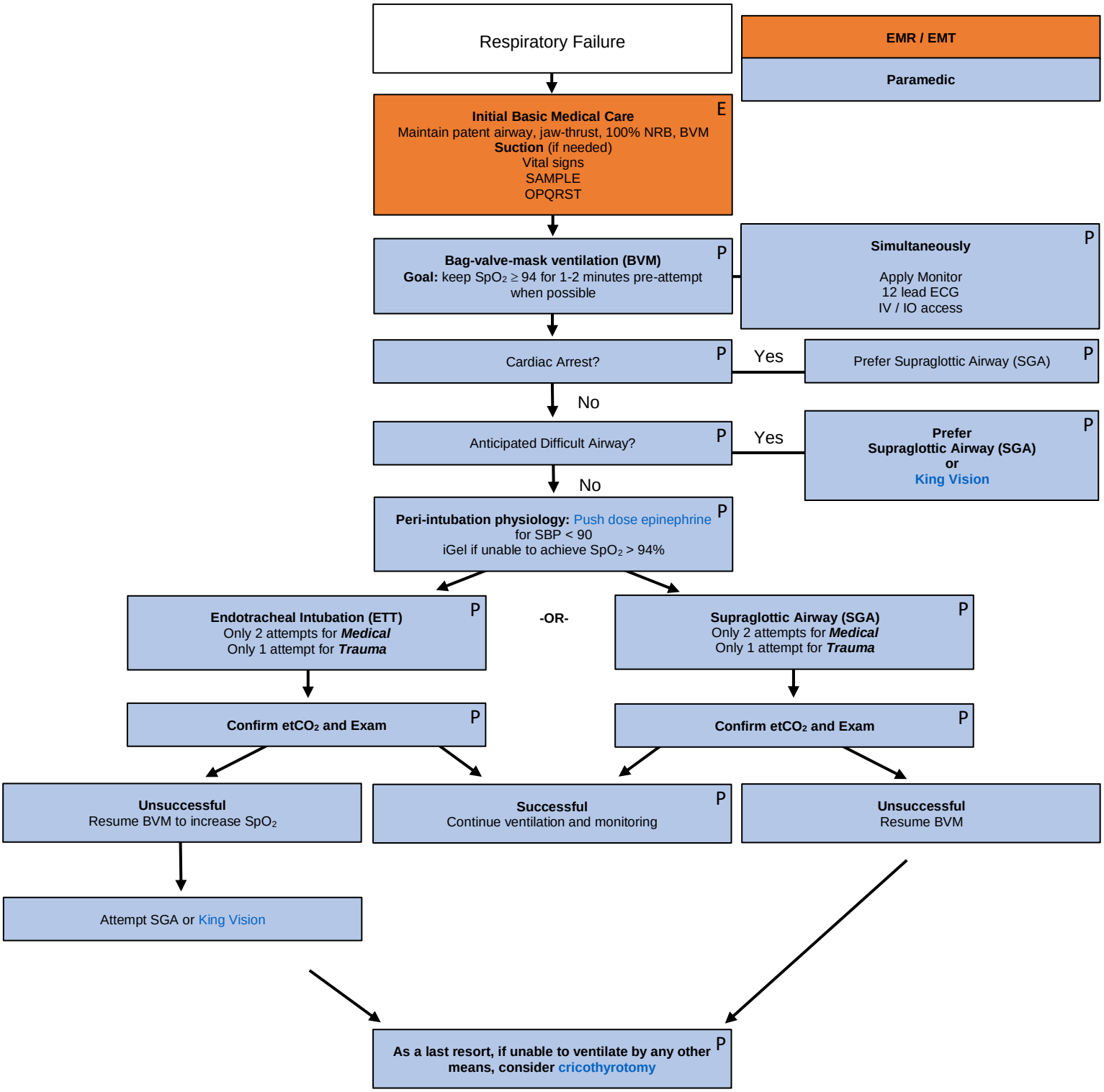
Confirmation of Placement and Effectiveness of Ventilation (ETT or SGA)

Capnography / $etCO_2$ monitoring:

- Digital waveform capnography is the **standard** for $etCO_2$ monitoring.
- Continuous $etCO_2$ monitoring is a ***mandatory*** component of invasive airway management.
- Immediately after placing an ETT or SGA, capnography shall be applied to confirm proper placement.
  - Proper placement is indicated by the presence of a continuous alveolar waveform on capnography.
  - If an alveolar waveform is not initially present, or disappears after 3-5 breaths (i.e., flat-line), remove the ETT or SGA and proceed to the next step in the algorithm (next page)
- Patients should not be switched from digital capnography to colorimetric device for monitoring $etCO_2$, unless on-scene equipment failure:
  - If capnography is not available due to serious on-scene equipment failure, apply a colorimetric $etCO_2$ detector capable of continuous $etCO_2$ monitoring (much less reliable)
- If continuous expired $etCO_2$ cannot be detected by either of the above methods (waveform or colorimetric), the invasive airway device **must** be removed, and the airway managed noninvasively (BVM)

Additional Measures:

- Assess epigastric sounds, breath sounds, and chest rise and fall
- Record tube depth and secure in place using a commercial tube holder
- Utilize head restraint devices (i.e., "head-blocks") or rigid cervical collar and long spine board immobilization as needed to help secure airway device in place



Allergic Reaction / Anaphylaxis

Medical Care

MANAGEMENT

Basic Life Support

- Maintain adequate airway. Bag-Valve-Mask ventilate if indicated.
- Supplemental oxygen to maintain SpO_2 > 94%. If oxygen is needed, notify dispatch / Levy DPS the patient is **critical**.
- Obtain full set of vital signs – before and after interventions.
- If the patient has a prescribed home medication for **simple allergic reaction** (i.e., rash, hives, itchiness), assist patient in self-administration of:
  - An inhaler
  - A tablet of *diphenhydramine* (Benadryl) 25 mg (*in adults*)
- If signs of **anaphylaxis** (oral swelling, stridor, wheezing, respiratory distress, hypoxia, full-body hives, or hypotension [systolic BP < 100 mmHg]), notify dispatch / Levy DPS the patient is **critical**.
  - The first responder may assist the patient in self-administration of the patient's own previously prescribed *epinephrine* (via auto-injector)

Advanced Life Support

- Maintain adequate airway. Proceed to "Airway Emergencies – Respiratory Failure" Protocol and intubation, if necessary.
- Supplemental oxygen to maintain SpO_2 > 94%.
- Establish IV / IO access. Maintain systolic BP > 100 mmHg. If hypotensive, follow "Severe Reaction" below.

Mild reaction (isolated itching, hives, local swelling)

- *Diphenhydramine* (Benadryl) 1 mg/kg IV (Max: 50 mg)
  - May be administered IM if no IV access available
- Consider *Methylprednisolone* (Solumedrol) 125 mg IV

Moderate reaction (mild dyspnea, wheezing, chest tightness)

- *Albuterol* (Proventil) 2.5 mg / 3 mL and *Ipratropium Bromide* 0.02% (Atrovent) 0.5 mg / 2.5 mL via nebulizer
  - Repeat *Albuterol* (Proventil) every 20 minutes if wheezing persists
  - Repeat *Ipratropium Bromide* (Atrovent) every 20 minutes if wheezing persists, for a max of 3.
- *Diphenhydramine* (Benadryl) 1 mg/kg IV (Max: 50 mg)
  - May be administered IM if no IV access available
- *Methylprednisolone* (Solumedrol) 125 mg IV

Severe reaction (anaphylaxis, systolic BP < 90 mmHg, stridor, severe respiratory distress)

- **Defined as a reaction that causes any oral edema (angioedema) or that affects 2 or more body systems**
- **i.e. urticaria + wheezing = anaphylaxis; urticaria + vomiting = anaphylaxis; angioedema = anaphylaxis**
- **These situations are all examples of anaphylaxis and should be given IM epinephrine before the initiation of an IV or other therapies**
- Evaluate for respiratory distress or compromise. Intubate if necessary

- *Epinephrine 1:1,000* 0.3 mg IM for rapidly progressive worsening of symptoms
    - 12 lead ECG
    - Repeat *Epinephrine* **ONCE** if signs/symptoms of severe reaction or shock persist after initial dose
    - If persistent signs/symptoms of severe reaction or shock, contact OLMD for additional orders
- *Albuterol* (Proventil) 2.5 mg / 3 mL and *Ipratropium Bromide* 0.02% (Atrovent) 0.5 mg / 2.5 mL via nebulizer
    - Repeat *Albuterol* (Proventil) every 20 minutes if wheezing persists
    - Repeat *Ipratropium Bromide* (Atrovent) every 20 minutes if wheezing persists, for a max of 3.
- *Diphenhydramine* (Benadryl) 1 mg/kg IV (Max: 50 mg)
    - May be administered IM if no IV access available
- *Methylprednisolone* (Solumedrol) 125 mg IV
- 0.9% NaCl at 20 cc/kg IV bolus

Cardiac Arrest or Cardiopulmonary Arrest Imminent

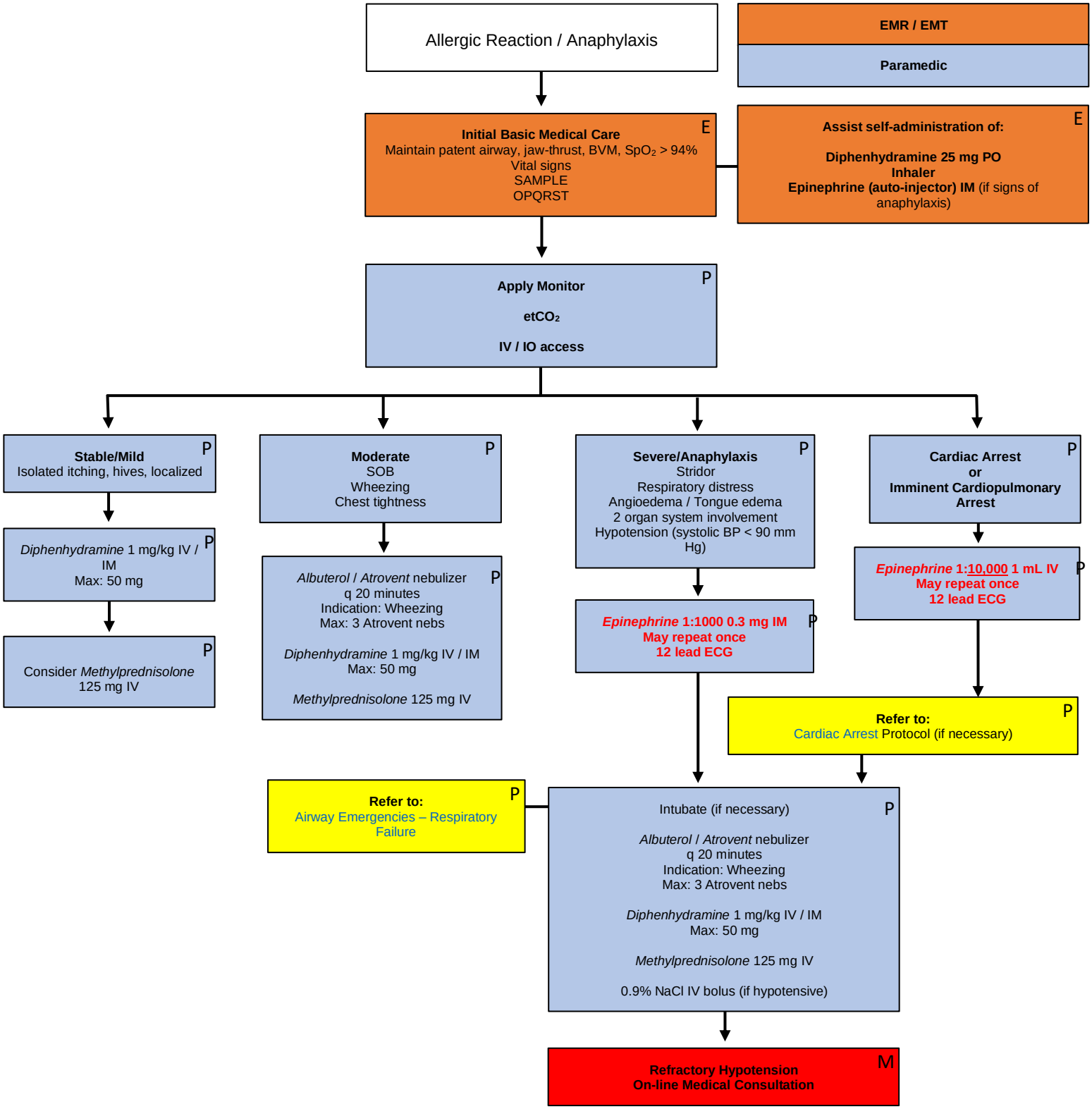
- *Epinephrine 1:10,000* 1 mL IV (instead of 1:1,000 IM)
    - 12 lead ECG
    - If hypotensive and unstable after initial dose, may **repeat dose** after 15 minutes.
    - If persistent signs/symptoms of severe reaction or shock, contact OLMD for additional orders
- For cardiac arrest, refer to the 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 and *Ipratropium Bromide* 0.02% (Atrovent) 0.5 mg / 2.5 mL via nebulizer
        - Repeat *Albuterol* (Proventil) every 20 minutes if wheezing persists
        - Repeat *Ipratropium Bromide* (Atrovent) every 20 minutes if wheezing persists, for a max of 3.
    - *Diphenhydramine* (Benadryl) 1 mg/kg IV (Max: 50 mg)
    - *Methylprednisolone* (Solumedrol) 125 mg IV
    - 0.9% NaCl at 20 cc/kg IV bolus

Medical Direction Options for Refractory Hypotension

- *Epinephrine* 2 – 10 mcg/min infusion, titrate to maintain systolic BP > 100 mmHg, preferred
- *Norepinephrine* 1 – 30 mcg/min infusion, titrate to maintain systolic BP > 100 mmHg
- *Dopamine* 5 – 20 mcg/kg/min infusion, titrate to maintain systolic BP > 100 mmHg

Allergic Reaction / Anaphylaxis

Medical Care



Allergic Reaction / Anaphylaxis

Medical Care

History	Signs and Symptoms	Differential:
• Onset and location • Insect sting or bite • Food allergy/exposure • Medication allergy/exposure • New clothing, soap, detergent • History of reactions • Past medical history • Medication history	• Itching or hives • Coughing/wheezing • Respiratory distress • Chest or throat constriction • Difficulty swallowing • Hypotension or shock • Edema	• Urticaria (rash only) • Anaphylaxis (systemic effects) • Shock (vascular effect) • Angioedema (drug induced) • Aspiration/airway obstruction • Vasovagal event • Asthma or COPD • CHF

PEARLS

- Symptoms range from *urticaria*, *flushing*, *itching*, and *facial edema* to *respiratory distress, laryngoedema* (manifested as laryngospasm or stridor), *hypotension,* and *shock*
- Within the past several hours, the patient may have been exposed to a precipitating medication, insect bite, allergen, or food.
- Attempt to identify the cause of allergic reaction (consider medications and latex) and prevent or eliminate further exposure.
- **The shorter the onset from contact to symptoms, the more severe the reaction.**
- **Be prepared for recurrence** of allergic signs and symptoms despite initial interventions.
- Early, rather than late, airway intervention may be required if swelling progresses rapidly.
- **Epinephrine may precipitate cardiac ischemia. These patients MUST receive a 12 lead ECG.**
- **Danger signs:** rapid progression of symptoms, respiratory distress (stridor, wheezing, dyspnea, increased work of breathing, persistent cough, cyanosis), abdominal pain, hypotension, chest pain, dysrhythmias
- Antihistamines and corticosteroids are *second*-line agents for the treatment of anaphylactic shock, after epinephrine
- Antihistamines should be administered after the airway is secured and hypotension is resolved (ABCs are priority).

Altered Mental Status

Medical Care

MANAGEMENT

Basic Life Support

- Assess level of responsiveness according to **AVPU**. Obtain **SAMPLE** history.
- Obtain full set of **vital signs** and evaluate for **hypoglycemia** (treat if indicated)
- Evaluate for **trauma** (cervical spine immobilization as indicated).
- Maintain SpO_2 > 94%. If oxygen is needed, notify dispatch / Levy DPS the patient is **critical**.
- If hypotensive (systolic BP < 100 mmHg), notify dispatch / Levy DPS the patient is **critical**.

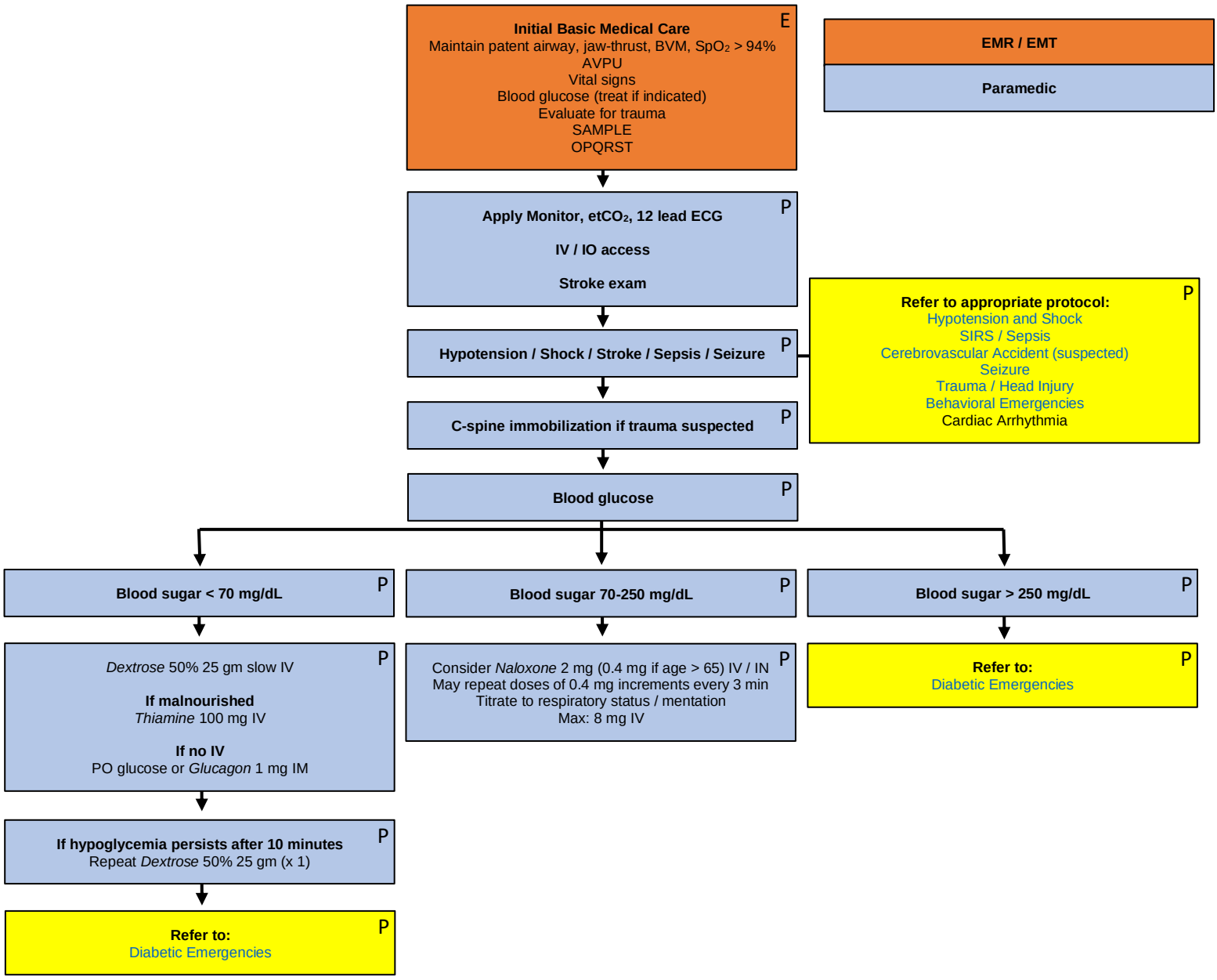
Advanced Life Support

- Full ALS Assessment and Treatment. Refer to "Medical Assessment and Care" Protocol.
- **Safety** for both the EMS crew and the patient is paramount. Take no action that may endanger EMS personnel or the patient. Consider restraints if necessary for patient's and/or personnel's protection. See "Behavioral Emergencies" Protocol
- Maintain adequate airway. Refer to "Airway Emergencies – Respiratory Failure" Protocol. Intubate, if necessary.
- Establish IV / IO access. Maintain systolic > 100 mmHg. If hypotensive, follow "Hypotension and Shock" Protocol.
- Obtain 12 lead ECG. Refer to appropriate cardiac protocol if indicated.
- If hypoglycemic (Blood glucose < 70 mg/dL [< 50 mg/dL if stroke]):
    - *Dextrose 50%* 25 gm slow IV
    - If the patient appears malnourished, administer *Thiamine* 100 mg IV
    - If no IV available:
        - Glucose paste or other oral glucose containing agent (e.g., orange juice) if patient is alert enough to self-administer oral agent
        - If unable to take oral glucose, administer *Glucagon* 1 mg IM
    - Recheck blood glucose after 10 minutes. If hypoglycemia persists:
        - Repeat blood glucose check with a different glucometer
        - Repeat *Dextrose 50%* 25 gm (x 1) if blood glucose < 70 mg/dL after 10 minutes
- If Opioid overdose suspected (significantly altered mental status or respiratory depression):
    - *Naloxone* (Narcan) 2 mg IV (for patients over 65 years old, start at 0.4 mg)
        - *Naloxone* (Narcan) can be given in 0.4 mg increments, titrated to mental status and respiratory drive (monitor respiratory status with continuous capnography)
        - If respiratory depression persists, repeat *Naloxone* 0.4 mg every 3 minutes to a max of 8 mg
        - If IV access has not been established, *Naloxone* (Narcan) can be given IM or via Mucosal Atomizer Device
    - If patient returns to baseline after *Naloxone*, further boluses may be necessary. Re-dose as needed to clinical effect (repeat doses every 3 minutes).
    - Be prepared for a combative patient if patient has a history of opiate abuse (e.g., heroin addict). Be prepared for acute narcotic withdrawal syndrome if patient is opiate dependent (as this may precipitate seizures or delirium).
    - ***Note: Patients presenting with altered mental status, and who respond to Narcan, are not candidates for informed refusal. Due to the short half-life of Narcan, these patients are medically incapacitated, and should be transported, regardless of the presence of an apparently normal mental status.***

Altered Mental Status

Medical Care

- If Seizure suspected, see "Seizure" Protocol
- If Stroke suspected, see "Cerebrovascular Accident (suspected)" Protocol
- If Sepsis suspected (advanced age, high risk for infection, febrile), see "SIRS / Sepsis" Protocol
- If Head Injury suspected, see "Trauma / Head Injury" Protocol. Perform spinal immobilization.
- If severely agitated and/or violent, see "Behavioral Emergencies" Protocol
- If cardiac arrhythmia present, see appropriate Cardiac Arrhythmia Protocol



Altered Mental Status

Medical Care

History	Signs and Symptoms	Differential:
• Known diabetic/medic alert tag • Drugs, drug paraphernalia • Report of illicit drug use or toxic ingestion • Medical history • Medications • History of trauma • Change in condition	• Decreased mental status • Change in baseline behavior • Bizarre behavior	• Head trauma • CNS (stroke, tumor, seizure, infection) • Cardiac (MI, CHF) • Infection/sepsis • Thyroid • Shock • Diabetes • Toxicologic • Acidosis, alkalosis • Environmental (exposure) • Pulmonary (hypoxia) • Electrolyte abnormalities • Psychiatric

PEARLS

- Be aware of altered mental status as a presenting sign of an **environmental toxin** or **HazMat** exposure. **Protect personal safety at all times!**
- Many of the conditions causing altered mental status have potential to cause significant morbidity and mortality. It is essential that care be started in the field *prior* to diagnosis.
- **Causes of acute altered mental status** ("DON'T") include **d**extrose (hypoglycemia), **o**xygen, **n**arcan, **t**rauma
- **Causes of altered mental status** ("AEIOUTIPS") include **a**lcohol, **e**ncephalopathies (hepatic or hypertensive), **i**nsulin (DKA or hypoglycemia), **o**piates, **u**remia (renal failure), **t**rauma, **t**oxins, **t**umors, **t**hyrotoxicosis, **i**nfections, **p**sychiatric, **s**eizures, **s**epsis, and **s**troke.
- It is safer to assume **hypoglycemia** than hyperglycemia if doubt exists.
- Do not let alcohol confuse the clinical picture.
  - Alcoholics frequently develop hypoglycemia or have *another* etiology for their altered mental status (besides alcohol).
- Do not give oral glucose if the patient cannot protect his/her own airway
- If a patient demonstrates restlessness, agitation, confusion, and/or potentially violent behavior (regardless of underlying diagnosis), the clinician shall assess the patient and take appropriate measures to medicate and restrain the patient prior to and during transport.
  - **Remember that agitation may signal a physiologic deterioration (look for hypoxia, hypoglycemia, cerebral edema, sepsis, etc.)**
  - **Safety for both the EMS crew and the patient is paramount. Take no action that may endanger EMS personnel or the patient.**
  - Consider restraints if necessary for patient's and/or personnel's safety. Refer to "Behavioral Emergencies" Protocol.
- Consider opiate overdose in patients with GCS < 12, respiratory depression (RR < 12), hemodynamic instability, pinpoint pupils, history of opiate use/abuse, etc.

Adult GCS					
Motor Response		**Verbal Response**		**Eye Opening**	
Obeys Commands	6	Oriented	5	Spontaneous	4
Localizes	5	Confused	4	To voice	3
Withdrawal	4	Inappropriate	3	To pain	2
Flexion	3	Incomprehensible	2	None	1
Extension	2	None	1		
None	1				

MANAGEMENT

Basic Life Support

- BSI / Scene safety.
- **Safety for both the EMS crew and the patient are of paramount concern. Take no actions that may endanger EMS personnel or the patient**
- **Always involve law enforcement if the patient may present a significant danger to him/herself, bystanders, yourself, or your partner**
- Maintain a calm and reassuring demeanor. Use good eye contact, empathetic and non-threatening body language. Do not make quick movements, argue with the patient, lie to the patient, or "play along" with visual or auditory hallucinations. Avoid escalating the situation.
- Do not leave the patient unattended. Never allow patients to be restrained in the prone or hog-tie position.
- Remove all loose objects or potential weapons from the patient care area.
- It would be prudent to secure any personal equipment (scissors, etc.) at a distance from the patient.
- Obtain full set of vital signs (if able). Supplemental oxygen to maintain SpO_2 > 94%.

Advanced Life Support

- Determine if patient is awake and alert, if possibility of traumatic injury exists, or if underlying medical problems (e.g., hypoglycemia, hypoxia, drug or alcohol intoxication) might cause the patient's behavioral difficulties. Refer to appropriate protocols.
- Apply physical restraints if needed to ensure patient / crew safety. If restraints are used, the receiving facility shall be notified.
- Restrain patients in supine or lateral recumbent position only, using no excessive force
- Never allow patients to be restrained in the prone or "hog-tied" position
- If unable to restrain, request driver to stop vehicle immediately and notify law enforcement personnel for assistance.
- When chemical or physical restraints are used, perform Full ALS Assessment and Treatment. Refer to "Medical Assessment and Care" Protocol.
- **EMS personnel should not transport an overly hostile patient alone. Any patient who is psychotic or could present a danger to personnel will be transported with 2 personnel in the patient compartment**.
- For patients with severe agitation compromising patient care or patient / crew safety, or for patients who continue to struggle against physical restraints:
    - *Haloperidol* (Haldol) 5 mg IM
        - Avoid if history of long QT-syndrome or dementia-related psychosis
        - May repeat once if adequate sedation not achieved on initial dose.
    - Alternative**:** *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg slow IV
        - May repeat once if adequate sedation not achieved on initial dose.
    - Alternative**:** *Ketamine* 1 mg/kg IV OR 1 mg/kg IM (Max single dose: 200 mg)
        - May repeat once after 10 minutes if adequate sedation not achieved on initial dose.
    - Alternative**:** *Lorazepam* (Ativan) 2 mg IV **OR** 2 mg IM.
        - May repeat once if adequate sedation not achieved on initial dose.

- For patients with anxiety (not agitated nor compromising safety):
  - *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg slow IV
  - Alternative**:** *Lorazepam* (Ativan) 2 mg IV **OR** 2 mg IM.

PEARLS

- A psychiatric disturbance is defined by an individual who is presenting with acute mental distress or disability not associated with a medical condition. In the field, this may be difficult to determine. Always consider a multitude of causes in your evaluation and treat accordingly. Refer to "Altered Mental Status" Protocol for differential diagnosis.
- Excited delirium is defined by any of the following: agitation, anxiety, hallucination, disorientation, violent and bizarre behavior, insensitivity to pain, elevated body temperature, and superhuman strength. Excited delirium arises commonly in male subjects with a history of mental illness, drug abuse (particularly stimulants), alcohol withdrawal, and/or head injury.
- Left untreated, patients with excited delirium can progress to death from cardiac or respiratory arrest, sometimes associated with the use of physical restraints or tasers.

Bites and Envenomations

Medical Care

MANAGEMENT

Basic Life Support

- Irrigate / cleanse wound with 0.9% NaCl (remove any large debris)
- Remove stinger if wasp or bee (if easily removed)
- Outline initial area of edema / erythema / ecchymosis with pen and note time.
- Immobilize affected part. Minimize all movement. Remove distal jewelry.
- Attempt to identify what caused bite. If possible, take a picture of the culprit (use caution when handling animals)
- Obtain full set of vital signs. Supplemental oxygen to maintain SpO_2 > 94%.

Advanced Life Support

- IV access
- Cardiac monitor
  - Treat dysrhythmias per protocol
- For signs of allergic reaction or anaphylaxis, refer to "Allergic Reaction / Anaphylaxis" Protocol
- If patient presents in shock
  - Administer boluses of 0.9% NaCl at 250 mL (max: 2000 mL). Recheck vital signs after each bolus.
  - Refer to "Hypotension and Shock" Protocol
- For Black Widow spider or Scorpion envenomations with severe muscle spasms
  - *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg slow IV
  - Alternative**:** *Lorazepam* (Ativan) 2 mg IV **OR** 2 mg IM.
- For patients with severe pain:
  - *Fentanyl* (Sublimaze) 1 mcg/kg (max single dose: 100 mcg) slow IV/IO; may repeat after 10 minutes as needed for severe pain (max total dose: 200 mcg) **OR** 100 mcg intranasal via MAD (divide dose equally between nostrils)
  - Alternative**:** *Morphine* 1-5 mg IV; may repeat once after 10 minutes PRN (max total dose: 10 mg) if systolic BP > 100 mmHg
  - Alternative**:** *Ketamine* 0.1 – 0.3 mg/kg (max single dose: 30 mg) slow IV/IO (caution when systolic > 160 mmHg)
- Use air transport as appropriate if significant delays with ground transport exist

PEARLS

There are many different types of snakes in Florida; some are venomous and some are not. Venom delivery in an attack is voluntary, even in a venomous snake. There have been reports that 25% of pit viper and 50% of coral snake bites are dry bites, meaning no venom is released into the wound. It is very difficult to tell clinically if venom has been injected, therefore all bites should be treated as though venom was injected. These patients should be transported and continually assessed. Do not tourniquet a bitten limb; this provides no benefit and can worsen tissue destruction.

Cardiac Arrest – General Approach

Medical Care

MANAGEMENT

- In the event a patient suffers cardiac arrest in the presence of EMS, the absolute highest priority is to apply the AED/Defibrillator and deliver a shock immediately if indicated.
- In the setting of cardiac arrest not witnessed by EMS, perform CPR immediately and continuously while setting up for rhythm analysis and delivery of shocks. If shockable rhythm present, deliver shock without delay.
- Mechanical CPR devices can be used as the initial compression delivery mode only if there is no delay in applying the device. If a delay in applying the device occurs, begin manual compressions immediately.

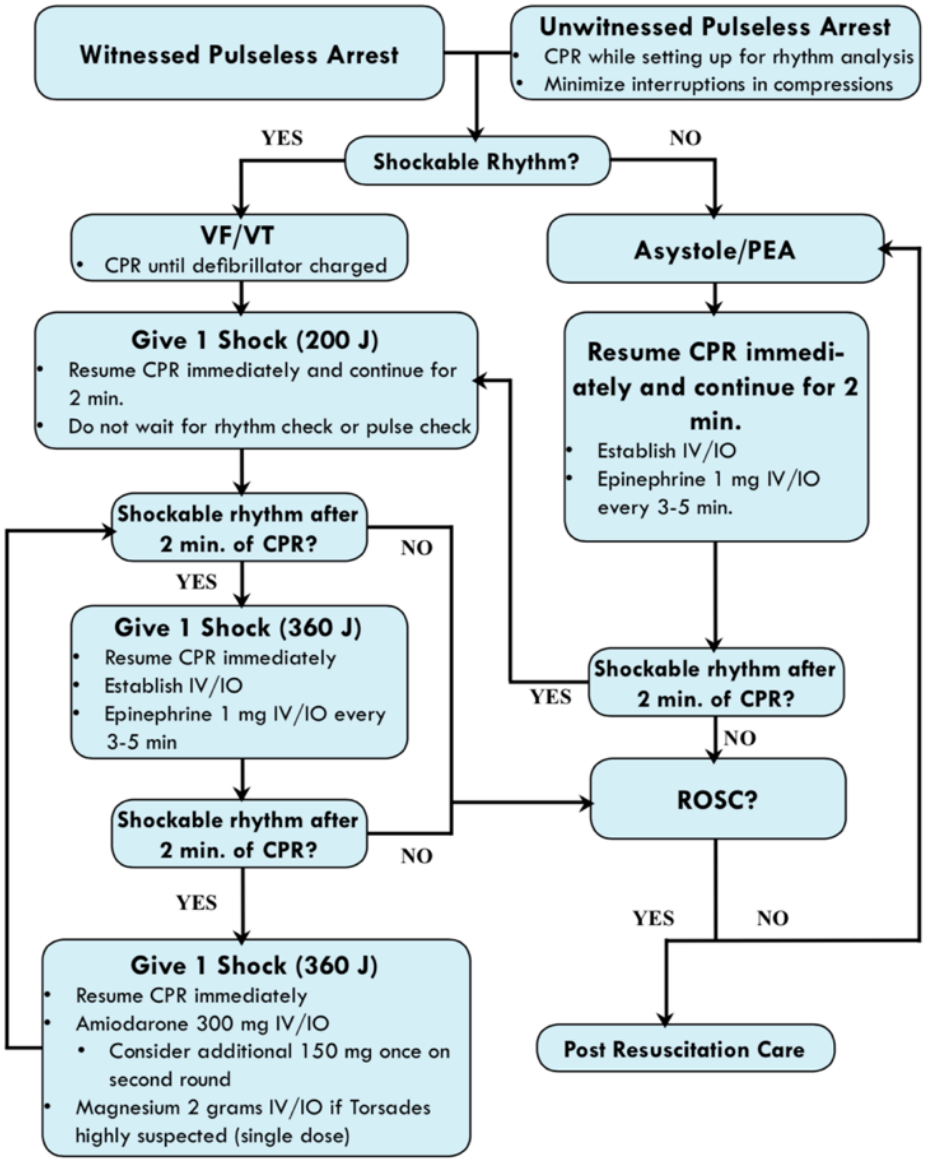
Basic Life Support

- Check responsiveness
- Call "Patient Contact" time to dispatch
- Open airway, check breathing, and feel for carotid pulse
- If a pulse is not definitely felt within 10 seconds, immediately begin chest compressions while preparing to apply AED or Monitor / Defibrillator
    - Compressions at a rate of 100 – 120/min
    - Exchange compressors every 2 minutes
    - Minimize interruptions to CPR
- Assist ventilation with **minimal interruptions to chest compressions**
    - 30:2 compression-to-ventilation ratio for BLS
    - Provide enough volume for chest rise
    - ETT / SGA in place – one breath every 6 – 8 seconds. **Avoid hyperventilation.**
- Apply AED / pads as soon as possible and follow directions
- If shockable rhythm identified by AED:
    - Administer shock and call "first shock" time to dispatch
    - After shock is delivered, resume CPR immediately for 2 minutes. Do not wait for pulse or rhythm check
- Re-analyze rhythm using AED and follow directions
- If pulse is present, continue assisted ventilation without chest compressions
- Obtain SAMPLE history from bystanders
- Airway management – open airway, c-spine precautions (if indicated), oral or nasopharyngeal airway

Advanced Life Support

- Identify team leader (analyzes rhythm, assigns tasks / roles to each member)
- Advanced airway / ventilatory management (e.g., ETT or SGA)
    - Do **not** interrupt compressions for airway placement
    - Continuous waveform capnography is required on every patient with an ETT / SGA in place
        - $etCO_2$ waveform and value $\geq$ 20 mmHg ensures adequate CPR and proper tube placement
        - Remove ET tube if no consistent waveform capnography or reading is produced
    - Supraglottic airways are preferred in cardiac arrest (rapid placement, decreased interruptions)
    - Ventilation rate of 8 – 10 per minute (or one breath every 6 – 8 seconds) (avoid hyperventilation)
- If unwitnessed arrest, immediately begin CPR and continue until ready for rhythm analysis

- Follow algorithm for specific rhythm
- Establish peripheral IV or IO access
    - All medications listed for IV use can be given IO
    - Endotracheal delivery of *Epinephrine*, *Naloxone*, and *Atropine* is an acceptable last resort if peripheral IV or IO access cannot be achieved
        - When delivered via endotracheal tube, administer 2-2.5 times the IV dose diluted in 5-10 mL of 0.9% NS or sterile water



Cardiac Arrest – General Approach

Medical Care

PEARLS

Important Principles for Cardiac Arrest Management

- Cardiac arrest leads to lack of blood flow to the brain, which can lead to brain death in minutes.
- High-quality cardiopulmonary resuscitation (CPR) and early defibrillation offer the best chance of survival and neurologic recovery following cardiac arrest. Focus on maintaining continuous compressions above all other interventions.
- Cerebral perfusion pressure falls rapidly after cessation of chest compressions. It is therefore imperative to maintain nearly continuous high-quality CPR and to minimize interruptions or provider fatigue
- **Minimize interruptions in chest compressions**
    - Compressions should begin immediately upon identifying pulselessness
    - Compressions should be continuous (no pause for ventilations)
- **Switch providers every 2 minutes when possible**
- **Minimize time between ceasing compressions and delivering shocks in VF/VT**
    - Whenever possible, continue CPR while defibrillator is charging
- **Avoid hyperventilation (use rate of 8-10 breaths/minute [or one breath every 6 – 8 seconds])**
- **Capnography is required on every patient with an ETT or SGA in place**
    - Allows rapid assessment of ROSC (marked by a sudden increase in etCO_2 value)
- **Consider the H's and T's that may have caused the arrest**

H's	T's
Hypoxia	Toxins
Hypovolemia	Tamponade (Cardiac)
Hydrogen Ion (Acidosis)	Tension pneumothorax
Hyperkalemia	Thrombosis, pulmonary
Hypothermia	Thrombosis, coronary

Cardiac Arrest – Asystole / Pulseless Electrical Activity

Medical Care

MANAGEMENT

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

Advanced Life Support

- Follow "Cardiac Arrest – General Approach" Protocol
- Rapidly consider and treat possible causes:

Potential Cause of Asystole	Treatment
Hypovolemia	• 0.9% NaCl 1-2 Liters IV/IO
Hypoglycemia	• *Dextrose 50%* 25 g (1 ampule) 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 gram IV/IO
Hypothermia	• Active rewarming
Toxins (drug overdose)	• See below
Tamponade, cardiac	• 0.9% NaCl 1-2 Liters IV/IO • Expedite transport
Tension pneumothorax	• Needle thoracostomy
Thrombosis, coronary	• Expedite transport
Thrombosis, pulmonary	• Expedite transport

- *Epinephrine 1:10,000* 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 blocker and beta blocker OD
    - *Calcium Chloride* 1 gram IV/IO for calcium channel blocker and beta 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 opiate OD
        - When opiate overdose is likely, repeat every 3-5 minutes (Max: 8 mg)
- For asystole **ONLY**, if no response to resuscitative efforts in 20 minutes (at least 3 rounds of drugs), consider discontinuation of efforts (see "Termination of Resuscitation" Protocol)

Cardiac Arrest – V Fibrillation / Pulseless V Tachycardia

Medical Care

MANAGEMENT

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
  - Continue CPR immediately after shock (do not stop to check pulse or rhythm)
  - Call "first defibrillation time" to dispatch (if not done above)
- Analyze rhythm after 2 minutes of good CPR; If VF/VT persists:
  - Defibrillate at 360 J
  - Continue CPR immediately after shock (do not stop to check pulse or rhythm)
  - *Epinephrine 1:10,000* 1 mg IV/IO every 3-5 min during arrest
- Analyze rhythm after 2 minutes of good CPR; If VF/VT Persists:
  - Defibrillate at 360 J
  - Continue CPR immediately after shock (do not stop to check pulse or rhythm)
  - *Amiodarone* 300 mg IV/IO bolus
    - For persistent VF/VT, give *Amiodarone* 150 mg IV/IO bolus on second round
    - Total cumulative dose of *Amiodarone* should not exceed 450 mg (300 mg + 150 mg)
  - Alternative: *Lidocaine* 1 mg/kg IV/IO bolus
- Continue cycle of CPR & Drug → Rhythm Check → CPR (while charging) → Shock → CPR and Drug → Rhythm Check → CPR (while charging) → Shock as needed
- A shock should be delivered about once every 2 minutes if the patient remains in VF/VT.
- Transport to the nearest Emergency Department
- Additional interventions to consider in special circumstances:
  - *Magnesium Sulfate* 2 g IV/IO push over 1-2 minutes only if suspected Polymorphic VT (torsades de pointes) or hypomagnesemic state (chronic alcohol, diuretic use)
  - *Sodium Bicarbonate* 1 mEq/kg IV/IO if suspected hyperkalemia (e.g., dialysis patient) or tricyclic antidepressant OD

Post Resuscitation Care

If the dysrhythmia resolves, initiate anti-dysrhythmic infusion unless contraindicated (e.g., allergies, bradycardia, etc.):

- *Amiodarone* 150 mg infusion over 10-15 minutes is preferred unless already given (*Amiodarone* 150 mg in 50 mL NS using a macro-drip infusion set run at no more than 1 drop/second, or its equivalent)
  - Followed by *Amiodarone* maintenance drip at 1 mg/min
- Alternative if *Amiodarone* unavailable or patient has *Amiodarone* / Iodine allergy:
  - *Lidocaine* 1 mg/kg IV/IO x 1, may repeat dose up to 3 mg/kg IV/IO as an acceptable alternative
  - *Lidocaine* 2 mg/min infusion using a micro drip set

Cardiac Arrest – Post Resuscitation Care

Medical Care

MANAGEMENT

Basic Life Support

- Maintain assisted ventilation as needed
- Supplemental 100% oxygen

Advanced Life Support

- Full ALS Assessment and Treatment
  - Obtain a 12 lead ECG and initiate **STEMI ALERT** if criteria exists
  - **Attempt to obtain a full neurological exam (including GCS and spontaneous movement) prior to sedation**
- For hypotension (systolic BP < 100 mmHg) not improved by fluid boluses, or when fluid boluses are contraindicated:
  - *Epinephrine* 2 – 10 mcg/min infusion, titrate to maintain systolic BP > 100 mmHg, preferred
  - *Norepinephrine* 1 – 30 mcg/min infusion, titrate to maintain systolic BP > 100 mmHg
  - *Dopamine* 5 – 20 mcg/kg/min infusion, titrate to maintain systolic BP > 100 mmHg
- Administer supplemental oxygen with a target SpO_2 of 94-98%
- For patients with assisted ventilation, provide 10-12 breaths per minute with a target $etCO_2$ of 35-40 mmHg
- Treat arrhythmias as directed by appropriate Cardiac Arrhythmias protocol
- If cardiac arrest reoccurs, refer to appropriate protocol based on presenting rhythm:
  - Total cumulative dose of *Amiodarone* should not exceed 450 mg (300 mg + 150 mg)
- If patient becomes combative, administer *Midazolam* (Versed) 2.5 mg slow IV **OR** 5 mg IM
  - Repeat *Midazolam* (Versed) 2.5 mg slow IV **OR** 5 mg IM if patient still combative
- **Transport to the nearest PCI (Percutaneous Coronary Intervention) capable hospital**

Cardiac Arrest – Termination of Medical Resuscitation

Medical Care

MANAGEMENT

- The paramedic has the discretion to **continue** resuscitative efforts in any case *despite* Termination of Resuscitation criteria being met if scene safety, location, patient's age, time of arrest, or bystander input compels this decision. This decision should be made by an ALS provider.
- Low amplitude V-Fib or PEA may be difficult to distinguish from asystole when using only the cardiac monitor display for interpretation. When asystole is seen on the cardiac monitor, confirmation shall include interpretation of the rhythm in more than one lead.
- Cardiopulmonary resuscitation may be halted when:
    - Effective spontaneous circulation (ROSC) has been restored as per current ACLS and AHA CPR/ECC guidelines
    - Resuscitation efforts have been transferred to persons of no less skill than the initial providers
    - The following criteria are met ("Medical Direction Contact Not Required", "Medical Direction Contact Required")

Medical Direction Contact Not Required

The paramedic may terminate resuscitative efforts in non-hypothermic adults provided all 6 of the following criteria exist:

- **Initial rhythm is asystole** confirmed in two leads and on printed rhythm strip
- **Terminal rhythm is asystole** confirmed in two leads and on printed rhythm strip
- **Secure airway** confirmed by waveform capnography (ETT or SGA)
- At least **four doses of Epinephrine** have been administered (given every 3-5 min)
- Cardiac arrest refractory for at least **20 minutes of ACLS**
- Quantitative **etCO2 value is < 10 mmHg** with effective CPR, after 20 minutes of ACLS

♦ Do not terminate resuscitation if transport has been initiated ♦

Medical Direction Contact Required

Medical Direction contact for "termination of resuscitation" orders is appropriate if cardiac arrest persists after at least 20 minutes of aggressive ACLS. Provide the OLMD Physician with the following information:

- Initial rhythm and terminal rhythm
- Method of airway management and vascular access
- Medications given during the arrest
- $etCO_2$ value
- Total amount of time working the arrest

The decision to continue efforts and transport is at the sole discretion of the Medical Oversight Physician. If termination orders are given, document the time the order was given as the "time of death".

Blunt or penetrating trauma:

- Follow Cardiac Arrest –Traumatic protocol

Cardiac Arrest – No Resuscitation Attempt

Medical Care

MANAGEMENT

Paramedics should provide CPR and resuscitative efforts to all patients in cardiopulmonary arrest, unless definite evidence demonstrates that death has already occurred.

♦ When in doubt, resuscitate and transport ♦

No resuscitation attempt is indicated for cardiac arrest in the following scenarios:

Death is determined to be present if ALL OF THE FOLLOWING are evident:

- Unresponsive
- Pulseless
- Apneic
- Absence of electrical activity on cardiac monitor in 2 or more leads (Confirmation of asystole shall include a printed rhythm strip, as well as interpretation of the rhythm in more than one lead.)
- At least one of the following:
    - Rigor mortis or generalized cyanosis
    - Decomposition of body tissues
    - Dependent lividity – diffuse purple-red discoloration of gravity-dependent areas, occurring hours after death, from blood pooling
    - Injuries incompatible with life (e.g., incineration, decapitation, hemicorporectomy)

Blunt or penetrating trauma:

- Follow Cardiac Arrest –Traumatic protocol

"Do Not Resuscitate" (DNR Order)

- When presented with a completed, legal, yellow State of Florida DO NOT RESUSCITATE order (HRS Form 1896)
    - Must be on YELLOW Paper and signed by the patient's physician
    - If there is any question about the validity of the DNR document, the paramedic shall contact medical oversight. Until there is a clear understanding as to the validity of the order, CPR will be performed

Use caution in the following scenarios:

- When mechanism of injury is inconsistent with traumatic cardiac arrest
- Lightning or other high voltage electrical injuries – patients with electrical injuries may have transient and/or prolonged asystole that is still responsive to resuscitative measures. Therefore, transport to the most appropriate facility is recommended.
- Drowning
- Suspected hypothermia – hypothermic patients should be resuscitated until normal body temperature is achieved.

In order to preserve trace evidence at a death scene, avoid covering the body when it is prudent and reasonable to do so. In the scenario when a person is deceased at a residence or other private area, partition off, or otherwise restrict access to, the area where the body is, as opposed to covering the body. However, there is no strict contraindication on covering the deceased, especially when the crews are trying to protect the dignity of the deceased or the mental state of their family.

Law Enforcement Officers on the scene should be involved in the decision how to best respect the patient's dignity without compromising investigative needs. The body will not be left unattended until LEO is present.

Cardiac Arrest – Traumatic

Medical Care

MANAGEMENT

Advanced Life Support

- *If cardiac arrest occurs before EMS arrival to scene* (Blunt or Penetrating trauma):
    - If no obvious medical cause of arrest and no signs of life are present on arrival, do not attempt resuscitation
        - Signs of life:
            - Pulse
            - Any respiratory effort
            - Spontaneous movement
            - PEA > 40 bpm or Ventricular Fibrillation/Ventricular Tachycardia
            - GCS >3
    - If any sign of life present or if medical cause suspected, remain on-scene and initiate manual CPR (do not load into ambulance unless scene unsafe)
        - Lucas Device not to be used on-scene during traumatic arrest resuscitation (may use during transport for provider safety)
    - Stabilize cervical spine
    - Perform bilateral needle decompression (may perform unilaterally if the injury is clearly unilateral)
    - Place tourniquets for major hemorrhagic injuries as indicated
    - Place pelvic binder if blunt trauma involving the abdomen/pelvis
    - Establish vascular access above the diaphragm
        - 2 large bore IVs preferred
        - Humeral IO preferred over Tibial IO
        - Do not obtain vascular access distal to a fractured extremity
    - Administer 2000 mL NS bolus rapidly
    - Pull all extremities out to anatomical length/position to reduce grossly deformed extremities
    - Remain on-scene and attempt resuscitation for at least 15 minutes
        - Co-manage with Trauma Assessment and Care Protocol and Cardiac Arrest Protocol
    - After 15 minutes of resuscitation efforts and performance of above measures on-scene, consider termination of resuscitation if no ROSC
        - If ROSC obtained, load into ambulance, transport to nearest trauma center, and continue trauma resuscitation during transport
- *If cardiac arrest occurs after EMS arrival but **before patient loaded** into ambulance* (Blunt or Penetrating trauma):
    - Remain on-scene and initiate manual CPR (do not load into ambulance unless scene unsafe)
        - Lucas Device not to be used on-scene during traumatic arrest resuscitation (may use during transport for provider safety)
    - Stabilize cervical spine
    - Perform bilateral needle decompression (may perform unilaterally if the injury is clearly unilateral)
    - Place tourniquets for major hemorrhagic injuries as indicated
    - Place pelvic binder if blunt trauma involving the abdomen/pelvis
    - Establish vascular access above the diaphragm

        - 2 large bore IVs preferred
        - Humeral IO preferred over Tibial IO
        - Do not obtain vascular access distal to a fractured extremity
    - Administer 2000 mL NS bolus rapidly
    - Pull all extremities out to anatomical length/position to reduce obvious fractures
    - Remain on-scene and attempt resuscitation for at least 15 minutes
        - Co-manage with Trauma Assessment and Care Protocol and Cardiac Arrest Protocol
    - After 15 minutes of resuscitation efforts and performance of above measures on-scene, consider termination of resuscitation if no ROSC
        - If ROSC obtained, load into ambulance and, transport to nearest trauma center, and continue trauma resuscitation during transport
- *If cardiac arrest occurs **after patient loaded** into ambulance* (Blunt or Penetrating trauma):
    - Initiate CPR (Lucas Device may be used during transport for provider safety)
    - Perform bilateral needle decompression (may perform unilaterally if the injury is clearly unilateral)
    - Place tourniquets for major hemorrhagic injuries as indicated
    - Place pelvic binder if blunt trauma involving the abdomen/pelvis
    - Establish vascular access above the diaphragm
        - 2 large bore IVs preferred
        - Humeral IO preferred over Tibial IO
        - Do not obtain vascular access distal to a fractured extremity
    - Administer 2000 mL NS bolus rapidly
    - Pull all extremities out to anatomical length/position to reduce obvious fractures
    - Transport to nearest trauma center while continuing trauma resuscitation

PEARLS

- Chest compressions are of limited value in traumatic cardiac arrest. The focus should be on reversible causes of death (hemorrhage control, application of pelvic binder, ventilation, decompression of chest, reduction of grossly deformed extremities, volume resuscitation, etc.) concurrent with initiating CPR
- Chest decompression should not be delayed for any other medical procedure or intervention to be accomplished
- CPR should be paused briefly during needle decompression to minimized the risk of injury to the provider
- Transport may be initiated in any traumatic arrest at any time if on-scene circumstances dictate (scene safety) or paramedic discretion

Cardiac Arrhythmias – Bradycardia

Medical Care

MANAGEMENT

Basic Life Support

- Obtain full set of vital signs
- Supplemental oxygen (if indicated)

Advanced Life Support

- Full ALS Assessment and Treatment. Refer to "Medical Assessment and Care" Protocol.
    - Administer boluses of 0.9% NaCl at 250 mL until systolic BP > 90 mmHg
        - Contraindicated if evidence of congestive heart failure (e.g., rales, JVD)
- If patient is unstable, do not delay treatment by obtaining 12 lead ECG unless diagnosis is in question
- If patient is normotensive, with no signs of shock, provide supportive care and expedite transport
- If patient is in 2nd degree Type 2 or 3rd degree heart block, place pacer pads immediately, place pacer in standby mode.

Unstable with serious signs and symptoms (HR < 50)

- **Unstable is defined as hypotension (systolic BP < 90 mmHg), ischemic chest pain, shortness of breath, acutely altered mental status, acute heart failure, and signs of shock**
- If patient is unstable, do **not** delay transcutaneous pacing for other treatments
- *Atropine* 1 mg IV if IV is readily available/established
    - Repeat every 3 minutes as needed (Max: 3 mg)
- If there is any delay in establishing an IV OR patient is unstable, initiate transcutaneous pacing using ***Demand Mode***:
    - Do not use asynchronous pacing
    - 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 ≥ 90 mmHg (Max: 100 beats/minute)
    - If systolic BP returns to ≥ 90 mmHg, consider sedation *Midazolam* 2.5 mg slow IV
    - Successful pacing will demonstrate **wide QRS complexes after an electrical impulse** on ECG
- For hypotension (systolic BP < 90 mmHg) not improved by the above:
    - *Epinephrine* infusion at 2-10 mcg/min IV titrated to maintain systolic BP > 90 mmHg, **OR**
    - *Dopamine* infusion at 2-10 mcg/kg/min IV titrated to maintain systolic BP > 90 mmHg
- If drug induced, treat for specific drug overdose:
    - Beta blocker OD, administer *Glucagon* 3 mg IV
    - Calcium channel blocker OD, administer *Calcium Chloride* 1 gram IV/IO
        - Contraindicated if patient on Digoxin / Lanoxin
        - *Glucagon* 3 mg IV if no response to *Calcium Chloride*
    - Opioid OD, administer *Naloxone* (Narcan) 2 mg IV (start at 0.4 mg for patients over 65 years old)
        - *Naloxone* (Narcan) can be given in 0.4 mg IV increments titrated to mental status and respiratory drive
        - If IV access has not been established, give IM or intranasal via MAD
    - Tricyclic Antidepressant OD, administer *Sodium Bicarbonate* 1 mEq/kg IV

Cardiac Arrhythmias – Bradycardia

Medical Care

PEARLS

Bradycardia is defined by HR < 60. This can be present in healthy individuals, for example, well-trained athletes. If the patient is asymptomatic or has only mild symptoms, provide supportive care and expedite transport. The above **therapies are indicated only when serious signs and symptoms are present**.

Cardiac Arrhythmias – Narrow Complex Tachycardia

Medical Care

MANAGEMENT

Basic Life Support

- Obtain full set of vital signs
- Supplemental oxygen (if indicated)

Advanced Life Support

- Full ALS Assessment and Treatment. Refer to "Medical Assessment and Care" Protocol.
- IV access
- Apply monitor and identify rhythm
- If patient is unstable, do not delay treatment by obtaining 12 lead ECG unless diagnosis is in question

Stable (Ventricular rate < 150):

- Rate < 150 beats/min **AND** asymptomatic (no chest pain, no palpitations, no dyspnea)
    - No anti-arrhythmic indicated
    - Provide supportive care and expedite transport

Stable or borderline (Ventricular rate > 150):

- Vagal maneuvers (Valsalva or cough)
    - Attempt vagal maneuvers after fluid bolus (NS 250 mL) for stable patients
    - Ice water contraindicated in patients with ischemic heart disease
- Evaluate 12 lead ECG for "delta wave" and shortened PR interval of Wolf-Parkinson-White Syndrome. If present, contact medical direction
- If rhythm is regular:
    - *Adenosine* (Adenocard) 6 mg rapid IV over 1-3 seconds, followed by rapid NS flush
        - If no response in 2 minutes, 12 mg rapid IV over 1-3 seconds, followed by rapid NS flush
- If no response in 2 minutes OR rhythm is irregular:
    - If patient is unstable (hypotension [systolic BP < 90 mmHg], chest pain, shortness of breath, acutely altered mental status, acute heart failure, and signs of shock):
        - If hypotension with no other symptoms, may consider boluses of 0.9% NaCl at 250 mL to increase systolic BP > 90 mmHg
        - If persistent hypotension or unstable, proceed to "Unstable with serious signs and symptoms (Ventricular rate > 150)" below.
    - If stable, administer *Diltiazem* (Cardizem) 0.25 mg/kg IV (max dose: 20 mg) over two minutes if available
        - Contraindicated if wide complex (QRS > 120 msec) or history of Wolf-Parkinson-White (WPW)
        - If no response in 15 minutes, *Diltiazem* (Cardizem) 0.35 mg/kg IV (max dose: 25 mg) over two minutes
        - Consider *Diltiazem* 5 mg/hr IV infusion (100 mg *Diltiazem* in 100 mL NS at rate of 5 mL/hr) in adults only
        - If patient is allergic to *Diltiazem*, or no response, contact medical direction
        - If no response, consider synchronized cardioversion

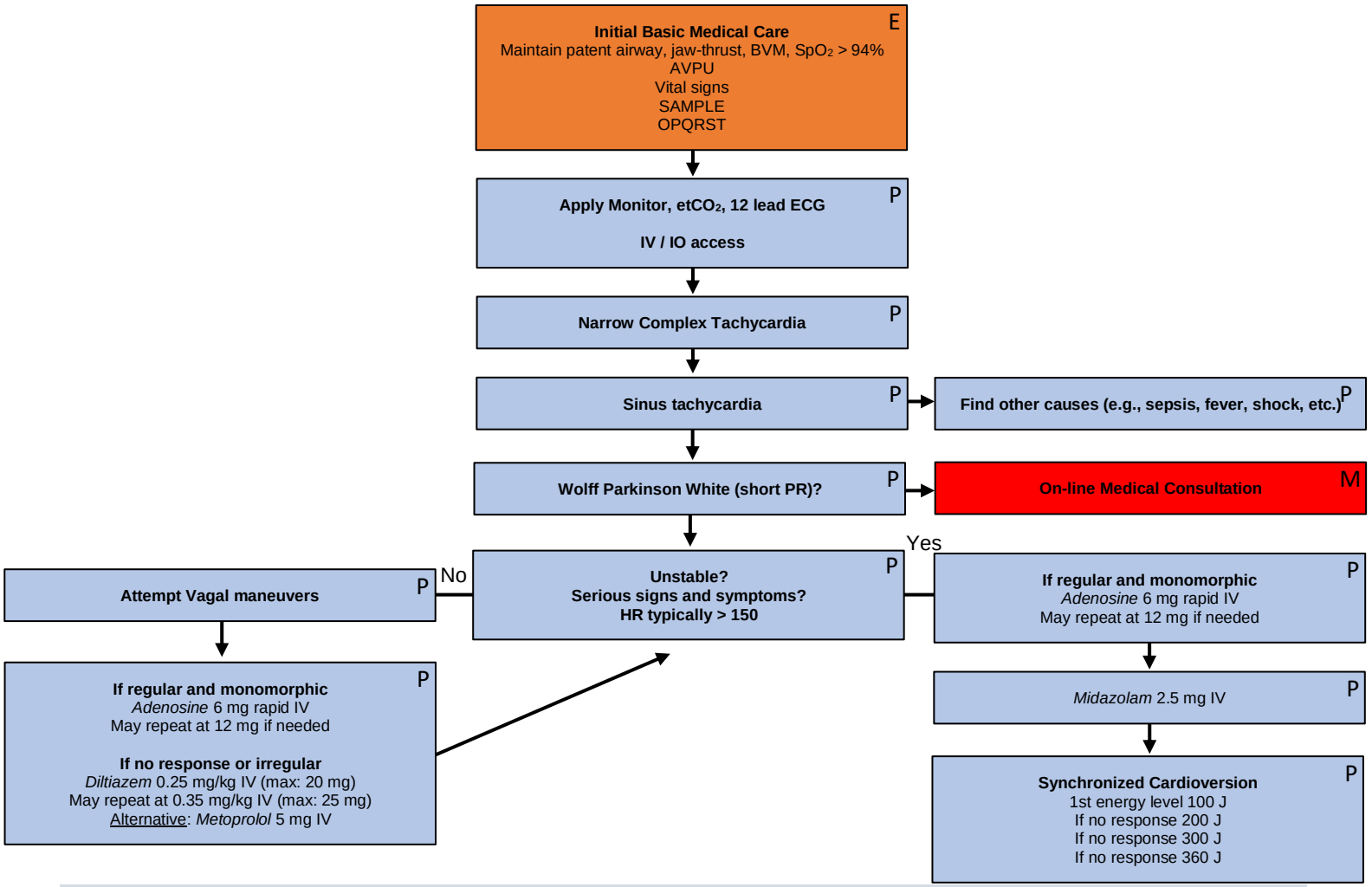
- Alternative: Administer *Metoprolol* (Lopressor) 5 mg slow IV over 2-3 minutes
  - Contraindicated if wide complex (QRS > 120 msec) or history of Wolf-Parkinson-White (WPW)
  - If no response in 5 minutes, repeat *Metoprolol* (Lopressor) 5 mg slow IV over 2-3 minutes
  - Max total dose: 10 mg IV *Metoprolol*
  - If no response, contact medical direction for additional orders

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

- **Unstable is defined as hypotension (systolic BP < 90 mmHg), ischemic chest pain, shortness of breath, acutely altered mental status, acute heart failure, and signs of shock**
- If patient is unstable, but has a regular and narrow complex tachycardia
  - May give brief trial of *Adenosine* 6 mg rapid IV over 1-3 seconds
- Synchronized Cardioversion
  - 1st energy level 100 J
  - If no response 200 J
  - If no response 300 J
  - If no response 360 J
- Consider sedation prior to cardioversion:
  - *Midazolam* (Versed) 2.5 mg slow IV
  - If patient is extremely unstable, do **not** delay cardioversion to sedate

Cardiac Arrhythmias – Narrow Complex Tachycardia

Medical Care



PEARLS

There are several different categories of tachycardic dysrhythmias. Often, these are very difficult to differentiate in the prehospital setting. There are criteria to help decide how to treat patients with a tachydysrhythmia, but electrical activity through the heart is dynamic and can change throughout your care of the patient. Pay close attention and continuously monitor these patients.

- Most patients presenting with tachycardia are experiencing **sinus** tachycardia in response to a body stressor. In these cases, tachycardia is a *symptom* of underlying pathology rather than the *cause* of the patient's distress. Persistently seek out and treat causes contributing to the patient's increased heart rate.
- Always consider other underlying causes and treat accordingly (e.g., dehydration, sepsis/fever, alcohol withdrawal)

Possible causes of sinus tachycardia:

- Fever
- Shock
- Pain
- Hypovolemia (vomiting/diarrhea)
- Hypoxia
- Abnormal electrolytes
- Drug ingestion
- Pneumothorax
- Cardiac tamponade

Cardiac Arrhythmias – Wide Complex Tachycardia

Medical Care

MANAGEMENT

Basic Life Support

- Obtain full set of vital signs
- Supplemental oxygen (if indicated)

Advanced Life Support

- Full ALS Assessment and Treatment. Refer to "Medical Assessment and Care" Protocol.
- If patient is unstable, 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 (VT)
- Start by placing defibrillation pads on the patient

Wide complex tachycardia with HR around 120 (AKA "slow VT"):

- This is concerning for toxic or metabolic syndrome (e.g., hyperkalemia, overdose, etc.)
- Do NOT give amiodarone!
- Administer the following medications:
  - *Calcium Chloride* 1 gram IV
  - *Sodium Bicarbonate* 1 mEq/kg IV

Stable wide complex tachycardia or ventricular tachycardia (rate > 150):

- *Amiodarone* 150 mg IV Piggyback over 10 minutes
  - Repeat *Amiodarone* 150 mg IV Piggyback over 10 minutes every 10-15 minutes (Max: 450 mg total)
- If *Amiodarone* is not available, *Lidocaine* 1 mg/kg over 1-2 min can be used
  - If ectopy is decreased, start a *Lidocaine* 2 mg/min infusion

Unstable wide complex tachycardia (rate > 150):

- **Unstable is defined as hypotension (systolic BP < 90 mmHg), ischemic chest pain, shortness of breath, acutely altered mental status, acute heart failure, and signs of shock**
- Synchronized Cardioversion
  - 1st energy level 100 J
  - If no response 200 J
  - If no response 300 J
  - If no response 360 J
- If wide complex tachycardia re-occurs following electrical cardioversion:
  - *Amiodarone* 150 mg IV Piggyback over 10 minutes
  - Repeat *Amiodarone* 150 mg IV Piggyback over 10 minutes every 10-15 minutes (Max: 450 mg total)
  - If *Amiodarone* is not available, *Lidocaine* 1 mg/kg over 1-2 min can be used
    - If ectopy is decreased, start a *Lidocaine* 2 mg/min infusion

Cardiac Arrhythmias – Polymorphic VT (Torsades)

Medical Care

MANAGEMENT

Basic Life Support

- Obtain full set of vital signs
- Supplemental oxygen (if indicated)

Advanced Life Support

- Full ALS Assessment and Treatment. Refer to "Medical Assessment and Care" Protocol.
- If patient is unstable, do not delay treatment by obtaining 12 lead ECG unless diagnosis is in question

Stable:

- *Magnesium Sulfate* 2 g slow IV in 100 mL D5W or normal saline over 5-10 minutes
- If no response, *Amiodarone* 150 mg IV Piggyback over 10 minutes
    - Repeat *Amiodarone* 150 mg IV Piggyback over 10 minutes every 10-15 minutes (Max: 450 mg total)
- If *Amiodarone* is not available, *Lidocaine* 1 mg/kg over 1-2 min can be used
- If patient becomes unstable at any time, revert to unsynchronized cardioversion (defibrillation).

Unstable – or if no response to the above measures:

- **Unstable is defined as hypotension (systolic BP < 90 mmHg), ischemic chest pain, shortness of breath, acutely altered mental status, acute heart failure, and signs of shock**
- ***Unsynchronized*** Cardioversion (defibrillation)
    - 1st energy level 200 J
    - If no response 300 J
    - If no response 360 J

Cerebrovascular Accident (suspected)

Medical Care

MANAGEMENT

Stroke Centers:

• AdventHealth Ocala (Primary)	1500 SW 1st Ave, Ocala
• Bravera Health Seven Rivers (Primary)	6201 N Suncoast Blvd, Crystal River
• HCA Florida Citrus Hospital (Primary)	502 W Highland Blvd, Inverness
• **HCA Florida North Florida Hospital (Comprehensive)**	6500 W. Newberry Rd, Gainesville
• **HCA Florida Ocala Hospital (Comprehensive)**	1431 SW 1st Ave, Ocala
• HCA Florida West Marion Hospital (Primary)	4600 SW 46th Ct, Ocala
• **UF Health Shands Hospital (Comprehensive)**	1515 SW Archer Rd, Gainesville

Basic Life Support

- Obtain full set of vital signs
- Supplemental oxygen to maintain SpO_2 > 94%
- Check blood glucose (refer to "Diabetic Emergencies" Protocol if indicated)
- Keep head of stretcher at 30°-45° elevation (unless spinal trauma suspected)
    - If spinal immobilization is indicated, elevate head of backboard 15°-30°
- If seizure activity, refer to "Seizure" Protocol
- Ascertain time patient seen last normal, i.e., from patient, family member, bystanders, etc.
- Give nothing by mouth. Patient must remain NPO.
- Notify dispatch that the patient is a **STROKE ALERT** if ALL of the following criteria are met:
    - Patient currently has an **abnormal** stroke assessment (CPHSS / FAST)
    - The patient has no evidence of trauma
    - The stroke symptoms are new, onset ≤ 24 hours (this includes patients who *awoke* with symptoms, as long as they were last seen normal within the past 24 hours)
    - Initial blood glucose is ≥ 50 mg/dL (**Note:** Blood glucose cutoff of **50** in stroke)

Advanced Life Support

- Full ALS Assessment and Treatment. Refer to "Medical Assessment and Care" Protocol.
- Airway management as needed.
    - If patient is intubated, ventilate to $etCO_2$ of 30 mmHg by waveform capnography
- Obtain vascular access
- For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses, or when fluid boluses are contraindicated:
    - *Norepinephrine* 1 – 30 mcg/min infusion, titrate to maintain systolic BP > 90 mmHg, preferred
    - *Dopamine* 5 – 20 mcg/kg/min infusion, titrate to maintain systolic BP > 90 mmHg
    - Refer to "Hypotension and Shock" Protocol
- If hypoglycemic (**Blood glucose < 50 mg/dL for stroke**):
    - *Dextrose 50%* 25 gm slow IV
    - If the patient appears malnourished, administer *Thiamine* 100 mg IV
    - If no IV available:

        - Glucose paste 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
    - Refer to "Diabetic Emergencies" Protocol
- Obtain a 12 lead ECG within 5 minutes of patient contact
- Initiate a **STROKE ALERT** if ALL of the following criteria are met:
    - Patient currently has an **abnormal** stroke assessment (CPHSS / FAST)
    - The patient has no evidence of trauma
    - The stroke symptoms are new, onset ≤ 24 hours (this includes patients who *awoke* with symptoms, as long as they were last seen normal within the past 24 hours)
    - Initial blood glucose is ≥ 50 mg/dL (**Note:** Blood glucose cutoff of **50** in stroke)
    - AND, EMS is not rendezvousing with MSTU. If EMS is rendezvousing with MSTU, do not issue a stroke alert.
- If patient meets **STROKE ALERT** criteria, determine the most appropriate stroke receiving facility:
    - Transport via **Mobile Stroke Treatment Unit (MSTU)** if:
        - **Last known normal is < 4 hours**, and
        - **MSTU is available to rendezvous**
    - Transport to a **comprehensive stroke center** if:
        - **Last known normal PLUS transport time combined is 4.5 – 24 hours**, or
        - **RACE Score** of **5 or greater**. A **RACE Score of 5 or greater** signifies a high likelihood of a large vessel occlusion and **must be transported to a comprehensive stroke center**, or
        - **Any** of the following conditions are present (regardless of RACE score):

Transport to Comprehensive Stroke Center (regardless of RACE score):
• Closest receiving facility • Last known normal and transport time combined is **> 4.5 hours and < 24 hours** • Patient is on any of the following blood thinners: Coumadin (warfarin), Pradaxa (dabigatran), Brilinta (ticagrelor), Xarelto (rivaroxaban), Lovenox (enoxaparin), Fragmin (dalteparin), Eliquis (apixaban) • Recent (within 14 days) or current bleeding, trauma, surgery, or invasive procedure • Pregnancy or completion / termination of pregnancy less than 30 days • Known intracranial pathology (tumor, aneurysm, arteriovenous malformation [AVM], intracranial hemorrhage)

    - Transport to a **primary stroke center** if **last known normal and transport time combined is < 4.5 hours**, the conditions for transfer to a comprehensive center (see above) are not present, **and** patient has a **RACE Score of 4 or less.**
    - **With an onset of symptoms < 6 hours, scene times and transport times should be minimized.** These patients should be **transported with lights-and-sirens (WLS)**. Consider delaying procedures such as IV initiation until transport is under way.
    - With an onset of symptoms > 6 hours, rapid transport is important, however WLS will be at the discretion of the paramedic (i.e., traffic patterns).

Cerebrovascular Accident (suspected)

Medical Care

- Immediately notify the appropriate stroke receiving facility
- If patient does not meet Stroke Alert criteria, transport to closest appropriate facility
- **Whenever possible, a family member should accompany the patient to the hospital to provide additional history and assist in medical decision-making. Obtain a good history from the family or witnesses as to onset of symptoms.** Document: witness information (name, telephone numbers), symptoms, symptom onset, time last seen normal, CPHSS / FAST / RACE exam. Be specific
- If seizures occur, refer to "Seizure" protocol
- For patients with severe nausea or vomiting:
    - *Ondansetron* (Zofran), 4 mg slow IV
    - May repeat once for a max of 8 mg.
- If hypertensive (systolic BP > 220 mmHg), contact OLMD for initiation of antihypertensive therapy.
    - **DO NOT treat elevated blood pressure** without consultation with OLMD

Cerebrovascular Accident (suspected)

Medical Care

STROKE ALERT criteria E

All criteria must be met:
- Abnormal FAST / CPHSS exam
- No evidence of trauma
- Stroke symptoms are new and ≤ 24 hours
- BGL > 50 mg/dL

Initial Basic Medical Care E
Maintain patent airway, jaw-thrust, BVM, SpO_2 > 94%
Vital signs
Blood glucose
SAMPLE
OPQRST
Head of bed elevation if trauma not suspected

EMR / EMT

Paramedic

If BGL < 50 and AMS
Dextrose 50% 25 gm IV P
Refer to "Diabetic Emergencies"

Monitor, $etCO_2$, 12 lead ECG P

IV / IO access

Confirm time "last seen normal"

Refer to appropriate protocol: P
Diabetic Emergencies
Hypotension and Shock
Seizure

Perform Cincinnati / FAST stroke exam P

STROKE ALERT criteria P
All criteria must be met
- Abnormal FAST / CPHSS exam
- No evidence of trauma
- Stroke symptoms are new and ≤ 24 hours
- BGL > 50 mg/dL
- EMS is NOT rendezvousing with MSTU

Confirm the patient is a STROKE ALERT P

Symptom Onset

Last known normal < 4 hours P

Mobile Stroke Treatment Unit, if available P

Not available

If rendezvous with MSTU, do not issue STROKE ALERT P

Last known normal + transport time combined < 4.5 hours P

RACE score

If RACE ≥ 5 Comprehensive Stroke Center WLS P

If RACE ≤ 4 Primary or Comprehensive Stroke Center WLS P

Last known normal + transport time combined 4.5 hours – 24 hours P

Comprehensive Stroke Center P

WLS if symptoms < 6 hours
Paramedic Discretion WLS if symptoms > 6 hours

If nausea / vomiting P
Zofran 4 mg IV

Establish 2nd IV P

Documentation P

On-line Medical Consultation M

Transportation Destination P
Transport to Comprehensive Stroke Center if any of the following criteria are met

- RACE ≥ 5
- Closest receiving facility
- Last known normal + transport time combined is **> 4.5 hours and < 24 hours**
- Patient is on any of the following blood thinners: Coumadin (warfarin), Pradaxa (dabigatran), Brilinta (ticagrelor), Xarelto (rivaroxaban), Lovenox (enoxaparin), Fragmin (dalteparin), Eliquis (apixaban)
- Recent (within 14 days) or current bleeding, trauma, surgery, or invasive procedure
- Pregnancy or completion / termination of pregnancy less than 30 days
- Known intracranial pathology (tumor, aneurysm, arteriovenous malformation [AVM], intracranial hemorrhage)

Cerebrovascular Accident (suspected)

Medical Care

History	Signs and Symptoms	Differential:

• Previous CVAs / TIAs
• Previous cardiac / vascular surgery
• Associated diseases: DM, HTN, CAD
• Atrial fibrillation
• Medications (anticoagulants)
• History of trauma
	• AMS
	• Weakness / paralysis / arm drift
	• Blindness or other sensory loss
	• Aphasia / dysarthria / slurred speech
	• Facial droop
	• Ataxia
	• Syncope
	• Vertigo / Dizziness
	• Nausea / Vomiting
	• Headache
	• Seizures
	• Respiratory pattern change
	• HTN / Hypotension
		• AMS
		• TIA
		• Seizure
		• Hypoglycemia / Diabetes
		• Stroke
		  • Thrombotic / Embolic (85%)
		  • Hemorrhagic (15%)
		• Tumor
		• Trauma / Head injury
		• Migraine headache
		• Symptomatic hypertension
		• Electrolyte abnormalities

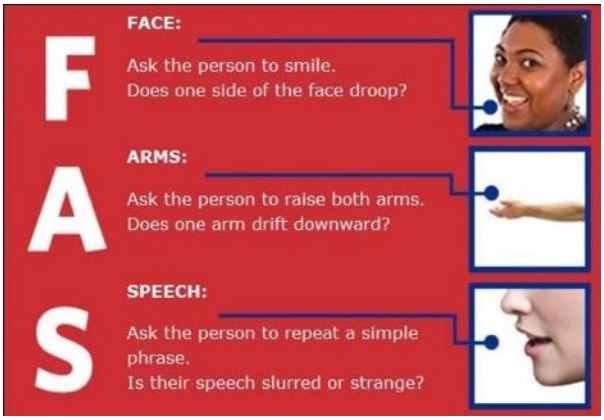
PEARLS

- Brain is lost quickly without adequate blood flow. Optimal patient outcomes depend on duration of patient symptoms and expeditious transport to an appropriate receiving facility.

- The **FAST Stroke Scale (aka Cincinnati Pre-Hospital Stroke Screen [CPHSS])** is a system used to diagnose a potential stroke in the pre-hospital setting. It tests three signs for abnormal findings which may indicate that a patient is having a stroke.

  <u>Cincinnati Pre-Hospital Stroke Screen</u>

  - **Facial Droop**: Have patient show teeth or smile
    - Normal: Both sides of face move equally
    - Abnormal: One side of face does not move as well
  - **Arm Drift**: Patient closes eyes and holds arms outward for 10 secs
    - Normal: Both arms move the same or both arms do not move at all
    - Abnormal: One arm does not move or one arm drifts downwards compared with the other
  - **Abnormal Speech**: Have the patient say the words: "You can't teach an old dog new tricks"
    - Normal: Patient uses correct words with no slurring
    - Abnormal: Patient slurs words, uses the wrong words, or is unable to speak



- The **Rapid Arterial oCclusion Evaluation (RACE)** scale for stroke helps to detect large vessel occlusions (LVO). Untreated LVOs have poor clinical outcome (approximately 80% of patients with an untreated LVO die within 90 days or become functionally disabled). Treatment of LVOs with tPA is associated with poor recanalization of the vessel. For this reason, mechanical thrombectomy is the best treatment modality for LVOs. Hence, the importance of applying the RACE score to determine potential thrombectomy candidates.

Cerebrovascular Accident (suspected)

Medical Care

Test Item	Score = 0	Score = 1	Score = 2	Patient Score
Facial Palsy	Absent	Mild	Moderate/Severe	
Arm Motor	Normal/Mild	Moderate	Severe	
Leg Motor	Normal/Mild	Moderate	Severe	
Head/Gaze Deviation	Absent	Present	N/A	
Aphasia* (if right hemiparesis)	Performs Both Tasks	Performs 1 Task	Performs Neither Tasks	
Agnosia* (if left hemiparesis)	Patient Recognizes Arm and Impairment	Unable to Recognize Arm or Impairment	Unable to Recognize BOTH Arm and Impairment	
			TOTAL SCORE: (0-9)	
***Aphasia: Ask the patient to: 1. "Close your Eyes" AND 2. "Make a Fist" *Agnosia: Ask the patient and evaluate recognition of deficit: 1. While showing paretic arm: "Whose arm is this?" 2. Ask patient: "Can you lift both arms and clap?"**				
If RACE Score ≥ 5, patient may have an ischemic stroke with a large vessel occlusion				

- The differential diagnosis listed in the "Altered Mental Status" Protocol should also be considered
- Be alert for airway problems (swallowing difficulty, vomiting).
- Hypoglycemia can present as a localized neurological deficit, especially in the elderly.
- Onset of symptoms is defined as the **time last seen normal**. Awakening with stroke symptoms would be defined as an onset time of the previous night when the patient was symptom-free.
- There is an 85% chance of a hemorrhagic stroke if the patient meets the following three criteria:
  - GCS < 8
  - Seizures
  - BP ≥ 220/120

ADDITIONAL INFORMATION / SPECIAL CONSIDERATIONS

- The transport paramedic will determine the closest appropriate receiving hospital for patients who meet criteria for immediate transport to a comprehensive stroke center or a primary stroke facility. Other facilities may need to be bypassed if a comprehensive stroke center is indicated.
  - **Consider air medical transport for prolonged transport times**
- Even though the patient meets tPA exclusion criteria (taking coumadin, past CVA, etc.), he/she is still considered a **STROKE ALERT** patient if assessment is positive
- If patient is intubated, ventilate to $etCO_2$ level of 30 – 35 mmHg, monitored by continuous waveform capnography.
- Although neurological symptoms may improve after a short period of time (sometimes, as brief as one hour, and may even completely resolve), these patients should be strongly encouraged to go to the hospital for further evaluation. Even if their symptoms have completely resolved, the patient should be made aware that they could potentially have experienced a ***transient ischemic attack (TIA)***, which significantly increases their risk of a large, devastating stroke within 24-48 hours.

Chest Pain – Suspected Cardiac Ischemia

Medical Care

MANAGEMENT

Basic Life Support

- Administer supplemental oxygen if the patient is dyspneic, hypoxemic, or has obvious signs of heart failure. Supplemental oxygen to maintain SpO_2 > 94%
- Assist patient in self-administration of previously prescribed Aspirin

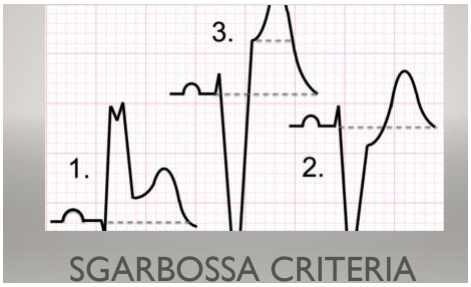
Advanced Life Support

- Full ALS Assessment and Treatment
  - Cardiac rhythm and the presence of a blood pressure must be assessed prior to and between each therapeutic measure when treating chest pain or cardiac dysrhythmias with a pulse
  - If systolic BP > 220 mmHg or diastolic BP > 120 mmHg, refer to "Hypertensive Emergencies" Protocol
- Perform ***12 lead ECG*** immediately (optimally within 5 minutes):
  - Identify the presence of ECG changes suggestive of Acute Myocardial Infarct (AMI)
  - If STEMI criteria are present initiate **STEMI ALERT** (see below)
  - Consider performing 15 lead ECG (if indicated)
  - Repeat 12 lead ECG after treatment or changes in patient condition (as time permits)
- *Aspirin* 324 mg PO, chewed if patient is able to swallow
  - Contraindicated if allergic or patient has taken 324 mg ASA in the last 6 hours
- *Nitroglycerin* 0.4 mg spray or tablet SL, every 5 minutes as needed for chest pain
  - Max: 3 doses
  - Contraindicated if systolic BP < 100 mmHg
  - Contraindicated if use of a Phosphodiesterase-5 (PDE5) inhibitor within:
    - 24 hours Viagra (Sildenafil), Levitra (Vardenafil), Stendra (Avanafil)
    - 48 hours for Cialis (Tadalafil)
    - *Please note that patients with history of pulmonary hypertension may be taking Sildenafil or Tadalafil to treat their pulmonary hypertension rather than for erectile dysfunction; it is important to clarify with this patient population whether or not they are taking a PDE5 inhibitor as nitroglycerin is contraindicated*
  - Contraindicated if Inferior Wall MI (II, III, aVF), or Right Ventricular infarct (ST elevation in V4R)
  - Be prepared to administer NS 250 mL boluses IV if hypotension develops
  - Alternative: *nitroglycerin* 2% ointment 1.5 inches applied to chest wall. Remove if systolic BP < 100 mmHg. Max: 1 dose. Contraindications if use of PDE-5 inhibitor or inferior MI.
- *Fentanyl* (Sublimaze) 1 mcg/kg (max single dose: 100 mcg) slow IV/IO
  - May repeat after 10 minutes as needed for severe pain (max total dose: 200 mcg) if no chest pain relief after 3rd *Nitroglycerin* dose
  - Contraindicated if systolic BP < 100 mmHg
  - Use with caution if right ventricular or posterior wall MI (ST elevation in posterior leads with marked depression V1 thru V4)
  - **Note:** *Ketamine* is not to be given in the setting of suspected cardiac ischemia
- *Lorazepam* (Ativan) 1 – 2 mg slow IV once if needed for anxiety
- If runs of Ventricular Tachycardia occur:

  - *Amiodarone* 150 mg IV Piggyback over 10 minutes. Refer to "Cardiac Arrhythmias – Wide Complex Tachycardia" Protocol
  - Isolated PVC's do not require treatment
- For patients with severe nausea or vomiting:
  - *Ondansetron* (Zofran), 4 mg slow IV or 4 mg Oral Disintegrating Tablet (ODT) by mouth
- If evidence of hypotension / shock, refer to "Hypotension and Shock" Protocol.

STEMI ALERT (ST Elevation Myocardial Infarction):

- A **STEMI ALERT** will be instituted for patients having chest pain or ischemic equivalent symptoms and any of the following:
  - **ST segment elevation ≥ 1 mm (0.1 mV) in 2 or more contiguous leads**
  - Septal, anterior, and lateral infarction: ST elevation in lead **V1-V6, I, aVL**
  - Inferior infarction: ST elevation in **II, III,** and **aVF** with reciprocal depression in aVL
    - Obtain V4R to evaluate for right sided MI
    - If a patient is hypotensive (systolic BP < 100 mmHg) in the presence of V4R elevation:
      - Administer IV NS 250 mL bolus
      - Bolus may be repeated to bring systolic BP > 100 mmHg
  - Posterior infarction: ST depression in anterior (V1-4) or aVR leads with tall upright R waves
    - Obtain V7, V8, V9
  - LBBB with the presence of any Sgarbossa criteria:
    - ST elevation or ST depression in same direction as major deflection of QRS complex ("positively concordant" or "negatively concordant")
    - ST/S ratio ≥ 0.25 if the ST segment is in the opposite direction as the QRS complex ("discordant")
- Transmit the 12 lead ECG to the nearest appropriate PCI (Percutaneous Coronary Intervention) capable center
- Transport **STEMI ALERT** patients to a PCI capable hospital

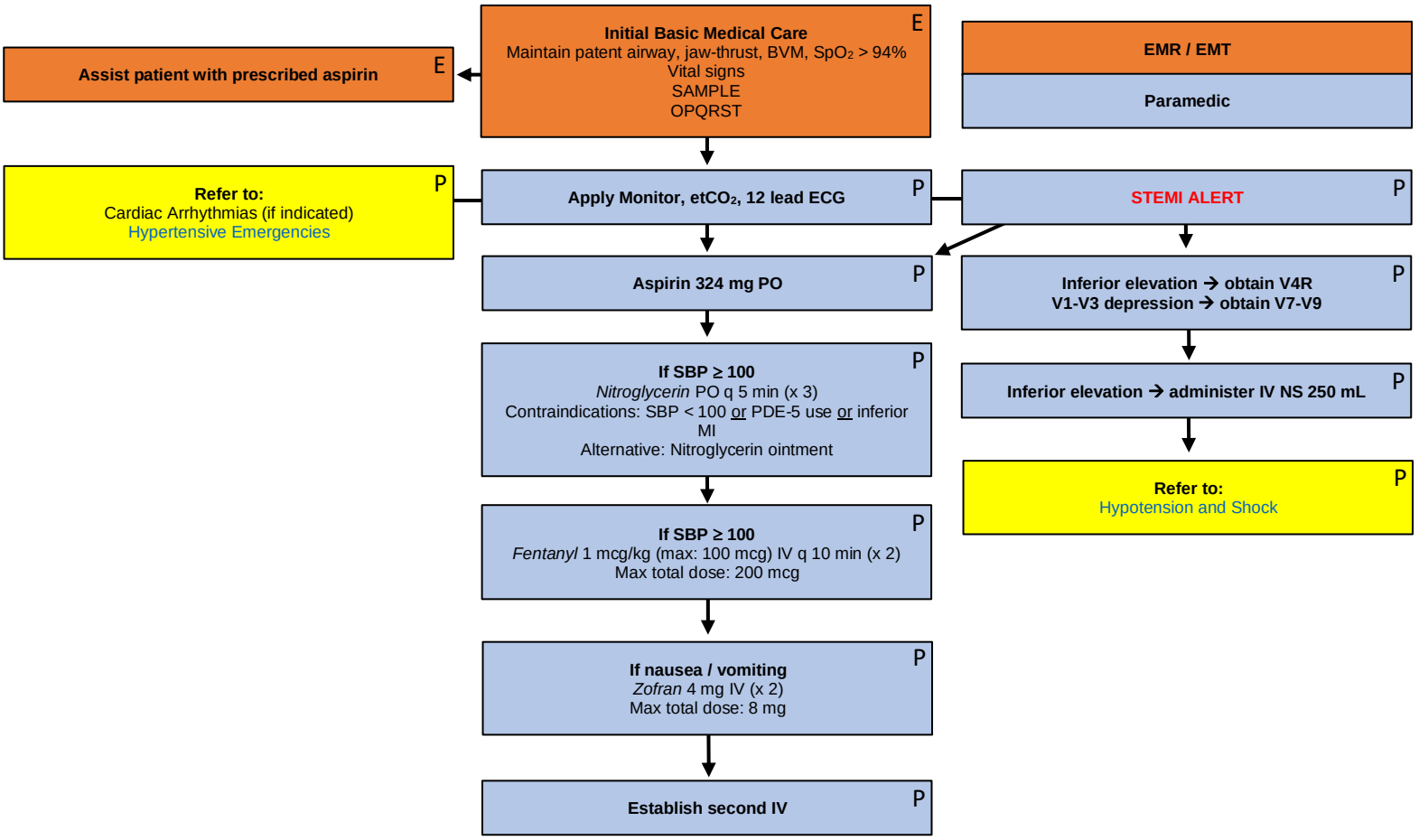


PCI Centers:

• AdventHealth Ocala	1500 SW 1st Ave, Ocala
• Bravera Health Seven Rivers	6201 N Suncoast Blvd, Crystal River
• HCA Florida Citrus Hospital	502 W Highland Blvd, Inverness
• HCA Florida North Florida Hospital	6500 W. Newberry Rd, Gainesville
• HCA Florida Ocala Hospital	1431 SW 1st Ave, Ocala
• HCA Florida West Marion Hospital	4600 SW 46th Ct, Ocala
• North Florida South Georgia VA Medical Center	1601 SW Archer Rd, Gainesville
• UF Health Shands Hospital	1515 SW Archer Rd, Gainesville

Chest Pain – Suspected Cardiac Ischemia

Medical Care



Chest Pain – Suspected Cardiac Ischemia

Medical Care

History	Signs and Symptoms	Differential:
• Age • Medications • Viagra, Levitra, Cialis • Past Medical History • Allergies • Recent physical exertion • Onset • Palliation / Provocation (movement, drinking fluids, deep inspiration, etc.) • Quality (cramping, constant, sharp, dull, etc.) • Region / Radiation / Referred • Severity (0 – 10) • Time (duration, repetition)	• Chest pain (pressure, aching, vice-like tightness, discomfort) • Location (substernal, epigastric, arm, jaw, neck, shoulder) • Radiation of pain • Pale • Diaphoresis • Shortness of breath • Nausea, vomiting • Weakness • Syncope / Near syncope • Dizziness	• Trauma vs Medical • Angina vs Myocardial Infarction • Pericarditis • Pulmonary embolism • Asthma / COPD • Pneumothorax • Aortic dissection or aneurysm • GE reflux or hiatal hernia • Esophageal spasm • Chest wall injury or pain • Pleural pain • Overdose (cocaine) • Anginal equivalents

PEARLS

- Chest pain is a concerning complaint which can be caused by anxiety, gastric reflux, musculoskeletal pain, pulmonary embolism, aortic dissection, pneumonia, or acute myocardial infarction. This spectrum of benign to fatal etiologies makes appropriate treatment for these patients difficult.
- ST Elevation Myocardial Infarction (STEMI) occurs when a coronary artery is occluded, typically after an atherosclerotic plaque breaks and a thrombosis develops.
- **Aspirin is the most important initial treatment**, followed by transport to the appropriate STEMI treatment facility for percutaneous intervention (balloons and stents).
- Aspirin has a very beneficial effect on mortality and should be administered as soon as possible. As with any chest pain patient, if a patient has already received Aspirin prior to our arrival, a repeat dose should be considered if it was not taken at full strength or within 6 hours.
- If a patient refuses Aspirin, or states they have an allergy, ensure that this is a true allergy and not just a concern with peptic ulcer disease (PUD). In the presence of a true allergy, Aspirin should be held, but if the patient has simply been instructed not to take Aspirin on a regular basis due to history of PUD, then Aspirin should be given. Patients already on Coumadin or Plavix can still receive Aspirin.
- Note that unusually tall T waves ("Hyperacute T's") may precede ST elevation. Serial 12 lead ECG's are important.
- In cases where diagnosis is not clear, obtain repeat 12 or 15-lead ECG and consider discussion with OLMD.

Diabetic Emergencies

Medical Care

MANAGEMENT

Basic Life Support

- Assess level of responsiveness according to **AVPU**. Obtain **SAMPLE** history.
- Obtain full set of **vital signs**.
- Check glucose level
    - If glucose is 80 or less, encourage the patient to self-administer a sugar source (juice, oral glucose tablets). Do NOT administer oral glucose to a patient with depressed level of consciousness or risk for aspiration.
    - If glucose is over 300, encourage the patient to drink 8 to 12 ounces of water.
    - If unconscious, notify dispatch immediately that the patient is **critical**.

Advanced Life Support

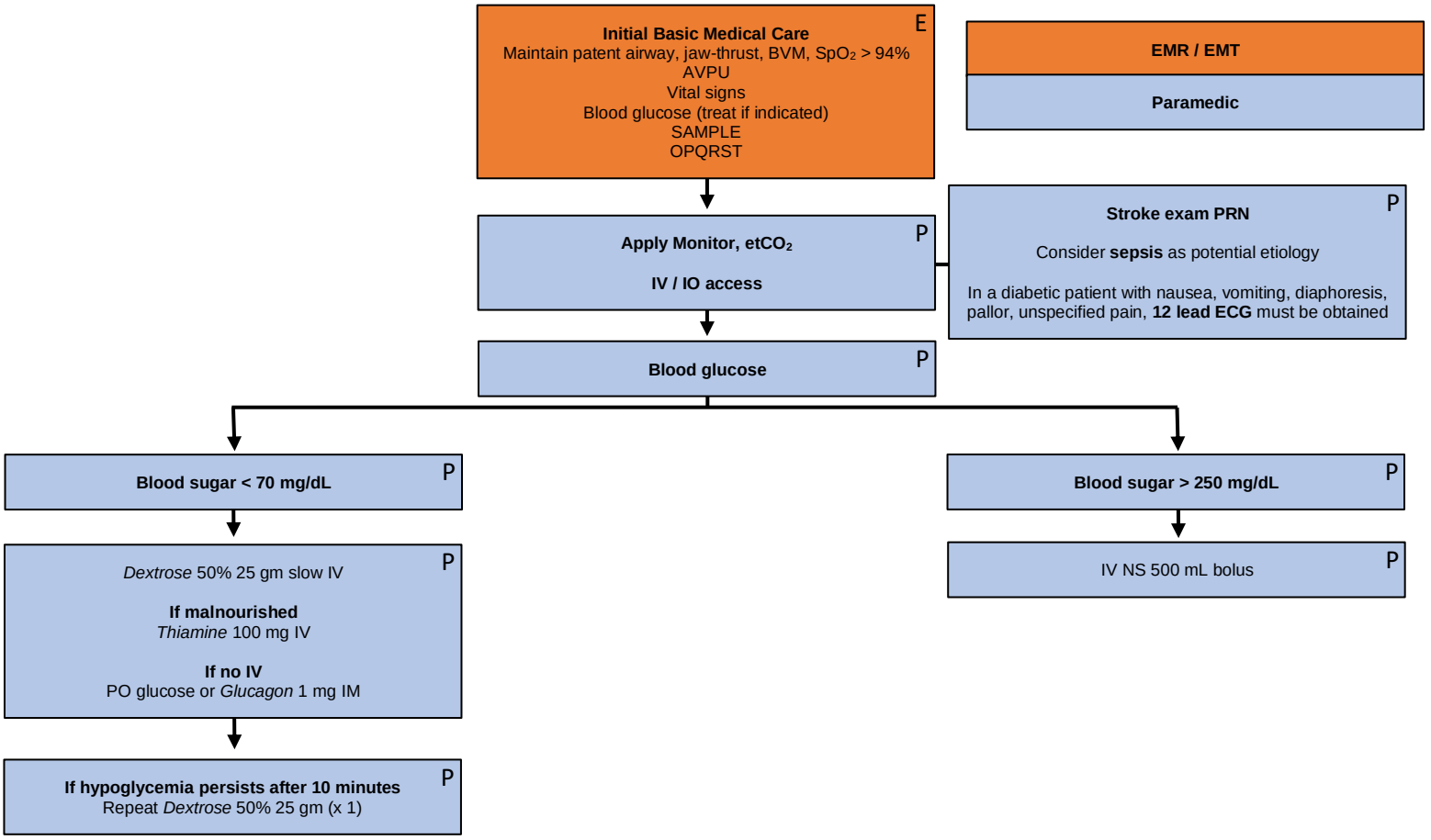
- Full ALS Assessment and Treatment. Refer to "Medical Assessment and Care" Protocol.
- Establish IV / IO access.
- In a diabetic patient with nausea/vomiting, diaphoresis, pallor, or unspecified pain, obtain a 12 lead ECG and refer to "Chest Pain – Suspected Cardiac Ischemia" Protocol
- If hypoglycemic (Blood glucose < 70 mg/dL [< 50 mg/dL if stroke]):
    - *Dextrose 50%* 25 gm slow IV
    - If the patient appears malnourished, administer *Thiamine* 100 mg IV
    - If no IV available:
        - Glucose paste or other oral glucose containing agent (e.g., orange juice) if patient is alert enough to self-administer oral agent. Do not give oral glucose if the patient cannot protect his/her own airway.
        - If unable to take oral glucose, administer *Glucagon* 1 mg IM. All patients receiving *Glucagon* IM must be transported.
    - Recheck blood glucose after 10 minutes. If hypoglycemia persists:
        - Repeat blood glucose check with a different glucometer
        - Repeat *Dextrose 50%* 25 gm (x 1) if blood glucose < 70 mg/dL after 10 minutes
            - Patients with persistent hypoglycemia 10 minutes after first administration of D50 must be transported
    - After treatment with glucose/glucagon, the paramedic should investigate the cause of the hypoglycemic episode. This might suggest an underlying medical problem. **Remember occult sepsis/infection can present as hypoglycemia!!**
- If hyperglycemic (Blood glucose > 250 mg/dL)
    - Administer bolus of 0.9% NaCl at 500 mL if no evidence of fluid overload (e.g., rales, JVD, etc.)
    - Recheck blood glucose intermittently

Oral hypoglycemic agents:

- Oral hypoglycemic agents have longer half-lives than insulin, so blood glucose of patients on oral medications may drop even after initial blood glucose correction. Patients on oral hypoglycemic agents are at risk for

recurrent hypoglycemic events (sometimes up to 24 hours out)! These patients should be **STRONGLY URGED to be transported**. If the patient refuses transport, OLMD must be contacted.

- Patients on **long-acting insulin** may have similar problems. If the patient refuses transport, contact OLMD
- Examples of long-acting agents include:
  - Metformin/Glucophage
  - Sulfonylureas (medications that begin with **Gli-/Gly-**): Glipizide, Glyburide, Glimepiride
  - Meglitinides (medications that end with **–inide**): Repaglinide, Nateglinide
  - Thiazolidinediones (medications that end with **–glitazone**): Rosiglitazone, Pioglitazone
- Examples of long-acting insulins include:
  - NPH, Lantus, Levemir
- Note: these lists are not meant to be all-inclusive and comprehensive. They are meant to be educational and used as a quick reference. If there are medications on the patient's medication list that the paramedic is unsure of, it is imperative that the paramedic look up or contact OLMD to ensure the medications are not long-acting hypoglycemic agents.



Diabetic Emergencies

Medical Care

History	Signs and Symptoms	Differential:
• Onset and duration • History of hypertension • Seizures • Medical history • Pre-eclampsia • Drug or alcohol use • Head trauma • Current medications • Allergies	• Headache • Nose bleed • Dizziness • Syncope • Weakness • Speech difficulties • Abdominal pain • Visual disturbances • Projectile vomiting	• Altered mental status • Hypoglycemia • Hyperglycemia • Trauma • CNS disorders • AMI / ACS • Sepsis

PEARLS

- **Hypoglycemia** (low blood glucose) is a medical emergency and may cause anxiety, irritability, confusion, altered mental status, weakness, neurologic symptoms, or unconsciousness.
- **Hyperglycemia** (high blood glucose) may cause severe dehydration and acidosis, and may be accompanied by increased thirst or urination, fatigue, rapid breathing, or abdominal pain.
- It is **safer to assume hypoglycemia** than hyperglycemia if doubt exists.
- Recheck blood glucose after administration of **oral glucose** or **D50** or **glucagon.**
    - After treatment with glucose/glucagon, the paramedic should investigate the cause of the hypoglycemic episode. This might suggest an underlying medical problem. **Remember occult sepsis/infection can present as hypoglycemia!!**
- Glucagon
    - Patients with prolonged hypoglycemia may **not** respond to glucagon.
    - Patients with **liver failure may not respond** to glucagon due to decreased glycogen stores.
- Do not let alcohol confuse the clinical picture.
    - Alcoholics frequently develop hypoglycemia or have another etiology for their altered mental status.
- If a diabetic patient has nausea, diaphoresis, pallor, or unspecific pain, consider this may be an anginal equivalent and treat based on "Chest Pain – Suspected Cardiac Ischemia" Protocol.

Dysbarism / Diving Accidents

Medical Care

MANAGEMENT

Basic Life Support

- Assess level of responsiveness according to **AVPU**. Obtain **SAMPLE** history.
- Obtain full set of **vital signs**.
- Administer 100% oxygen by nonrebreather mask
- If trauma suspected or patient is unresponsive, perform cervical spine immobilization
- Place patient in left lateral position
- Keep patient warm

Advanced Life Support

- Monitor for possible or developing tension pneumothorax
    - Positive pressure ventilation (BVM, intubation) may worsen a pneumothorax
- Transport to the closest appropriate ED
- The Divers Alert Network (DAN) is a national nonprofit organization for medical assistance with diving emergencies. Their medical contact for acute diving emergencies is 919-684-9111

MANAGEMENT

Chemical Burns and Dermal Exposure

Basic Life Support

- Stop the burning process
- Remove all clothing prior to irrigation
- If a caustic liquid is involved, flush with copious amounts of water
- If a dry chemical is involved, brush it off, then flush with copious amounts of water
- Do not use water for elemental metals (sodium, potassium, lithium) and phenol:
    - Remove obvious metallic fragments from skin and cover the burn with mineral oil or cooking oil
    - As a last resort, use extremely large amounts of soap and water with continuous irrigation until all phenols are removed
- For chemical burns with eye involvement, immediately begin flushing the eye with normal saline and continue throughout assessment and transport
- Apply a burn sheet or dry sterile dressing to burn areas

Advanced Life Support

- For inhaled toxin with acute bronchospasm:
    - *Albuterol* (Proventil) 2.5 mg/3 ml and *Ipratropium Bromide* 0.02% (Atrovent) 0.5 mg/2.5 ml via nebulizer
        - Repeat *Albuterol* (Proventil)/*Ipratropium Bromide* (Atrovent) if wheezing persists
    - For persistent burning sensation of the airways (after *Albuterol/Atrovent*), administer *Sodium Bicarbonate (4.2%)* 5 ml via nebulizer
- Observe for signs of impending respiratory failure

HAZMAT ALERT

Purpose: Improve management of patient care scenarios involving HAZMAT exposures by creating a standard method to accomplish the following:

- Early notification of receiving hospitals of an incoming HAZMAT patient
- Early involvement of HAZMAT Teams in decision making
- Early involvement of the Regional Poison Control Center or OLMD when needed
- Assignment of an EMS Liaison to assist the ED in preparing for arrival of the patient
- Establishment of unified command between EMS and hospital
- To help redirect EMS transport traffic until the HAZMAT Alert has been cleared

Initiation of a HAZMAT ALERT

- **HAZMAT ALERT** should be initiated for the following:
    - At the time of dispatch, when a caller reports a medical emergency involving a chemical smell, or hazardous material exposure
        - Do not otherwise interfere with the standard dispatch process
    - When the first arriving crew suspects a hazardous material exposure due to odor, history, or other source of information

- By Hospital ED staff in the event a hazardous material exposure is suspected in a walk-in patient and additional resources are needed

Action Steps After a Hazardous Material Exposure is Recognized

- Immediately contact the dispatch center and initiate a **HAZMAT ALERT**
  - Notify Dispatch to contact Poison Control
  - Advise Dispatch of the EMS transport destination as soon as determined
  - Employ all agency standards to protect crew members from avoidable exposure
- After acknowledgement of the **HAZMAT ALERT**, Dispatch will:
  - Provide a "heads up" notification to the intended receiving hospital

Transfer of Care

- Prior to ED arrival, transporting crews should contact the ED or EMS Liaison to convey pertinent MIST information, and specifics of the decon strategy employed on scene
- Before entering ED, allow hospital staff to assess need for additional decon
  - EMS Liaison or hospital staff will meet arriving crews outside the ED entry door
  - Once on hospital property, all further medical care is directed by the ED staff

Hypertensive Emergencies

Medical Care

MANAGEMENT

A Hypertensive Emergency can be defined as systolic BP > 220 mmHg and/or diastolic BP > 120 mmHg. Prehospital treatment of isolated hypertension may result in critical reductions in target organ perfusion due to uncontrolled lowering of blood pressure. Focus on addressing the manifestations / resulting symptoms of hypertensive emergencies, such as chest pain or heart failure.

Basic Life Support

- Supplemental oxygen to maintain SpO_2 > 94%
- Encourage patient to take their own antihypertensive medications if they have not been taken, if the patient is alert and verbal

Advanced Life Support

- Full ALS Assessment and Treatment. Refer to "Medical Assessment and Care" Protocol.
- *Never treat hypertension based on one set of vital signs*. Repeat vital signs to confirm elevated blood pressure

Chest Pain Present:

- Refer to "Chest Pain – Suspected Cardiac Ischemia".
- 12 lead ECG
- *Aspirin* 324 mg PO, chewed if patient is able to swallow
  - Contraindicated if allergic or patient has taken 324 mg ASA in the last 6 hours
- *Nitroglycerin* 0.4 mg spray or tablet SL, every 5 minutes as needed for chest pain
  - Max: 3 doses
  - Contraindicated if use of a Phosphodiesterase-5 (PDE5) inhibitor within last 24 hours (Viagra or Levitra); 48 hours for Cialis
  - Contraindicated if Acute Inferior Wall MI (II, III, aVF), or Right Ventricular infarct (ST elevation in V4R)
  - Be prepared to administer NS 250 mL boluses IV if hypotension develops
  - Alternative: *nitroglycerin* 2% ointment 1.5 inches applied to chest wall. Remove if systolic BP < **150** mmHg. Max: 1 dose. Contraindications if use of PDE-5 inhibitor or inferior MI.
- *Fentanyl* (Sublimaze) 1 mcg/kg (max single dose: 100 mcg) slow IV/IO
  - May repeat after 10 minutes as needed for severe pain (max total dose: 200 mcg) if no chest pain relief after 3rd *Nitroglycerin* dose
  - Use with caution if right ventricular or posterior wall MI (ST elevation in posterior leads with marked depression V1 thru V4)
  - **Note:** *Ketamine* is not to be given in the setting of suspected cardiac ischemia

Severely symptomatic (severe chest pain, dyspnea, pulmonary edema, mental status change) or diastolic > 120:

- For patients with chest pain, altered mental status, signs of stroke, or pulmonary edema refer to the specific protocol
- *Nitroglycerin* 0.4 mg spray or tablet SL, every 5 minutes
  - Max: 3 doses

- Contraindicated if use of a Phosphodiesterase-5 (PDE5) inhibitor within last 24 hours (Viagra or Levitra); 48 hours for Cialis
- Contraindicated if Acute Inferior Wall MI (II, III, aVF), or Right Ventricular infarct (ST elevation in V4R)
- Be prepared to administer NS 250 mL boluses IV if hypotension develops
- Alternative: *nitroglycerin* 2% ointment 1.5 inches applied to chest wall. Remove if systolic BP < **150** mmHg. Max: 1 dose. Contraindications if use of PDE-5 inhibitor or inferior MI.

- *Labetalol* per protocol below (goal systolic BP < 180 mmHg or diastolic BP < 100 mmHg), or to symptomatic relief
  - Note: Cocaine usage is a **contraindication** to *Labetalol* or other beta blockers
  - **The goal is NOT acute normalization of the patient's blood pressure**. Rather, the goal is **reduction of blood pressure (MAP) up to 25%** or blood pressure down to 180/100
  - Monitor for symptomatic relief

  Labetalol protocol for severely symptomatic patients refractory to *Nitroglycerin*
  - [**0.2 mg/kg** IV push] – for a 70 kg adult, 15 mg
    Re-check blood pressure, if BP goal not reached within 5 minutes…
  - [**0.4 mg/kg** IV push] – for a 70 kg adult, 30 mg
    Re-check blood pressure, if BP goal not reached within 5 minutes…
  - [**0.8 mg/kg** IV push] – for a 70 kg adult, 60 mg
  - **Observe closely for progression of symptoms.**

No Chest Pain Present:

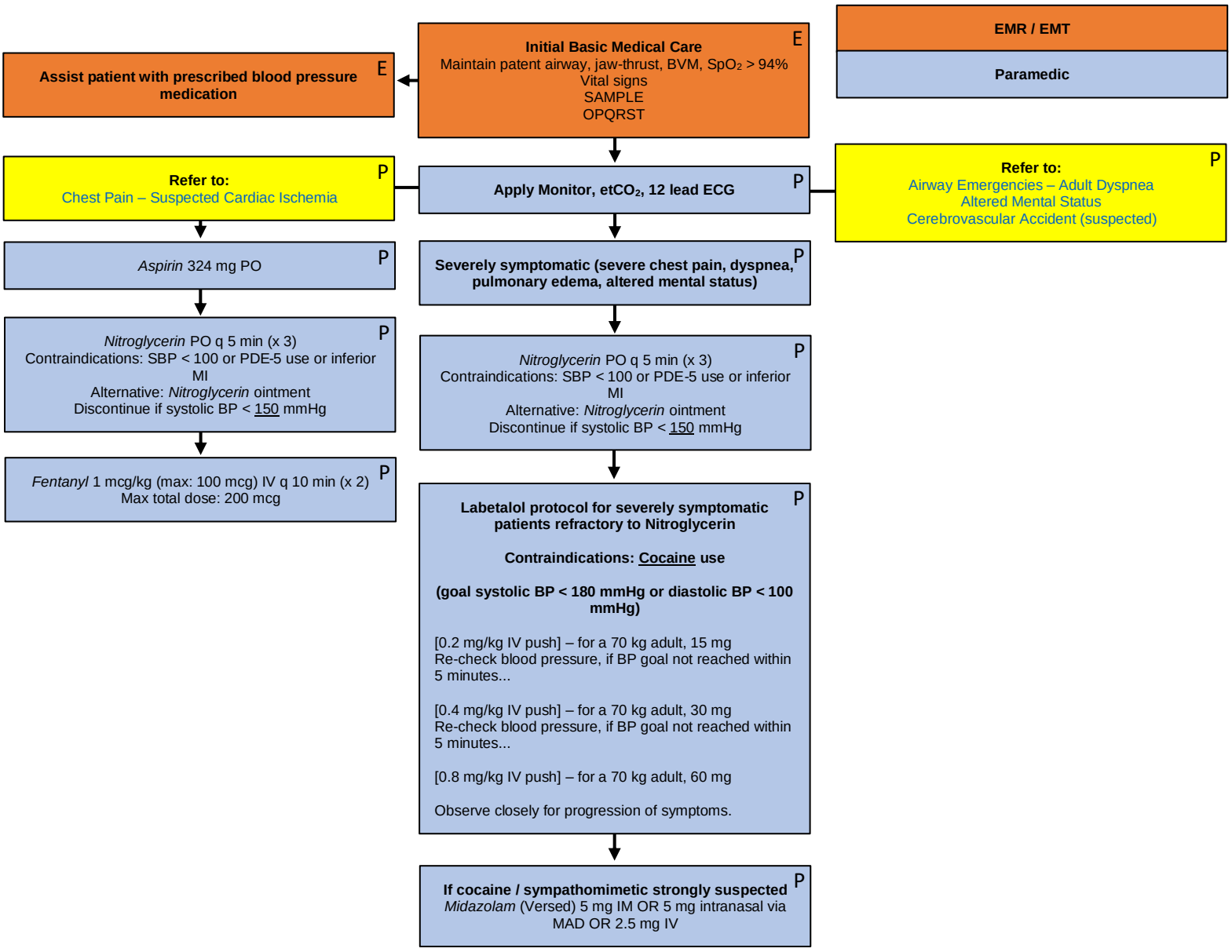
- Provide supportive care only
- For patients with altered mental status, signs of stroke, or pulmonary edema refer to the specific protocol

Hypertension related to Cocaine use:

- If cocaine / sympathomimetic toxicity strongly suspected:
  - *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg IV
    - May repeat *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg IV once
  - Alternative**:** *Lorazepam* (Ativan) 2 mg IV **OR** 2 mg IM
    - May repeat *Lorazepam* (Ativan) 2 mg IV **OR** 2 mg IM once
- Beta blockers are strongly **contraindicated** in cocaine use

Hypertensive Emergencies

Medical Care



Hypertensive Emergencies

Medical Care

History	Signs and Symptoms	Differential:
• Onset and Duration • History of hypertension • Seizures • Past Medical History • Preeclampsia • Drug or alcohol use • Head trauma • Current medications • Viagra, Levitra, Cialis • Allergies	• Headache • Nosebleed • Dizziness • Syncope • Weakness • Speech difficulties • Abdominal pain • Visual disturbances • Projectile vomiting • Chest pain (pressure, aching, vice-like tightness, discomfort) • Shortness of breath • Nausea, vomiting	• Altered mental status • Hypoglycemia • Pregnancy, Preeclampsia • Trauma • Major surgery < 14 days

PEARLS

Hypertension affects 1 in 4 Americans and can lead to heart attack, stroke, renal failure, and vascular diseases. It may present on a spectrum from asymptomatic elevations in blood pressure, to an acute hypertensive crisis with symptoms including chest pain, shortness of breath, headache, or confusion.

A hypertensive crisis is a medical emergency. Elevated pressures will eventually need to be treated. However, **rapidly decreasing a patient's blood pressure can lead to brain ischemia or stroke.** In general, blood pressure should be decreased gradually to allow the body time to compensate.

In patients suspected of having a stroke (CVA) or stroke-like symptoms, **the blood pressure should NOT be treated** unless directed by OLMD (i.e., to use less drug and/or allow the BP to remain in the high end of goal BP), as high pressures may be needed to maintain cerebral perfusion.

Hyperthermia

Medical Care

MANAGEMENT

Basic Life Support

- Vital signs – **BP**, **HR**, RR, SpO_2, **BGL**, **Temperature**. All patients should have temperature assessed.
- Evaluate skin condition – hot and clammy, cold and clammy, hot and dry?
- Evaluate consciousness (AVPU)
- Move patient to cooler environment. Remove outer layers of clothing (maintain privacy).
- Avoid rebound hypothermia with rapid cooling – shivering is too far

Heat Cramps

- Painful spasms of the extremities or abdominal muscles, normal mental status and vital signs (temperature not elevated), diaphoretic
    - Oral fluids as tolerated
    - Sponge with cool water

Heat Exhaustion

- Dizziness, lightheadedness, generalized weakness, headache, muscle cramping, nausea and vomiting, irritability, normal or slightly decreased LOC, normal or decreased blood pressure, tachycardia, normal or slightly elevated temperature, diaphoretic
- Keep patient supine. Remove clothing.
- Supplemental 100% oxygen
- Sponge with cool water and fan

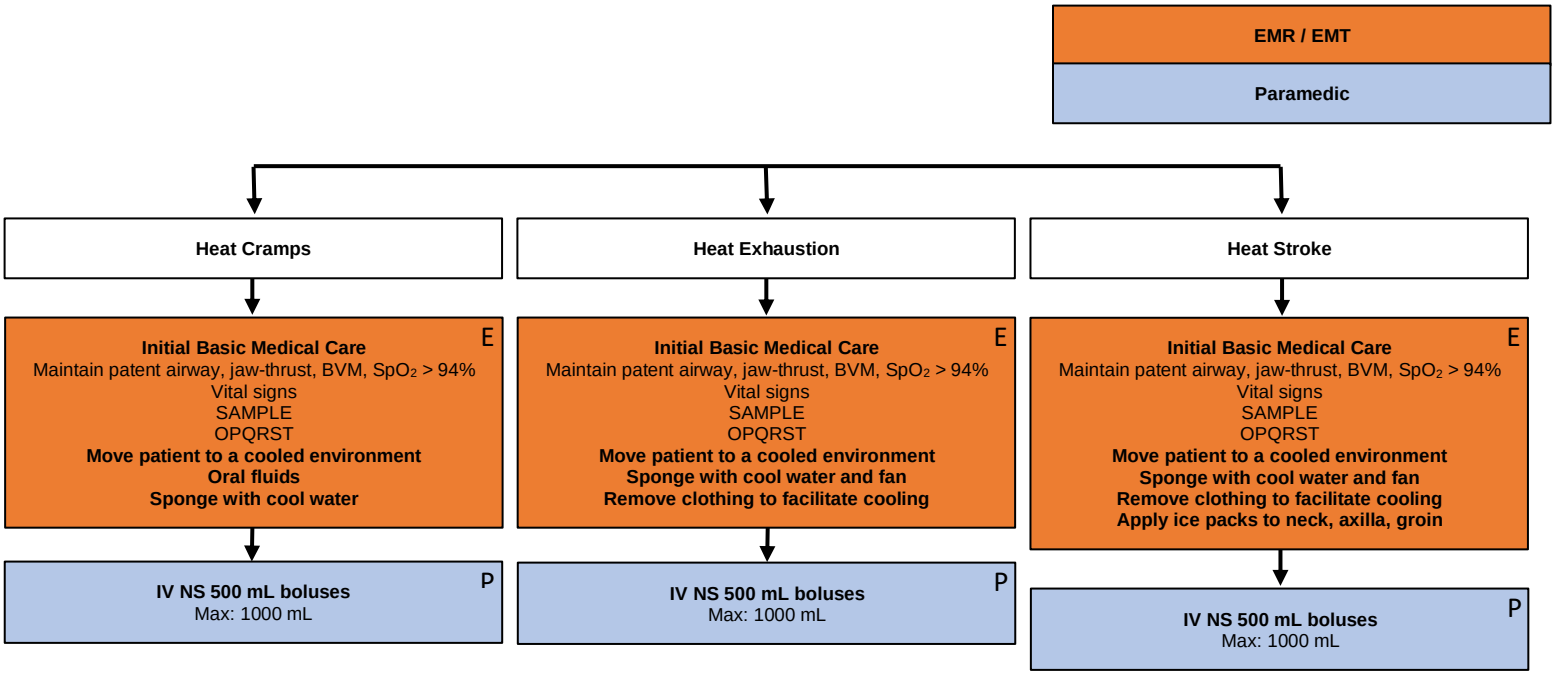
Heat Stroke

- Marked alteration in LOC, extremely high temperature (often > 104°F), may be sweating or have red/hot/dry skin, tachycardia, hypotension
- Remove clothing
- Position semi-reclining with head elevated 15-30°
- Supplemental 100% oxygen
- Rapid cooling:
    - Cold packs to axilla, groin, and neck
    - Sponge with cool water and fan
    - If significant shivering occurs, remove cold packs but continue fanning
- Monitor patient closely, rapid transport

Advanced Life Support

- Full ALS Assessment and Treatment. Refer to "Medical Assessment and Care" Protocol.
- Administer 0.9% NS 500 mL IV; may repeat as needed
- Hyperthermia may result from cocaine or other sympathomimetic toxicity:
    - If cocaine / sympathomimetic toxicity strongly suspected:
        - Give *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg IV

- Repeat *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg IV if adequate sedation not achieved
  - Alternative**:** *Lorazepam* (Ativan) 2 mg IV **OR** 2 mg IM. May repeat once.
- Expedite transport



History	Signs and Symptoms	Differential:
• Age • Exposure to increased temperatures and/or humidity • Medical history/medications • Extreme exertion • Length of exposure • Poor PO intake • Fatigue and/or muscle cramps	• AMS • Hot, dry, sweaty skin • Hypotension • Shock • Seizures • Nausea	• Fever • Dehydration • Medications • Hyperthyroidism • DT's • Heat cramps • Heat exhaustion • Heat stroke • CNS lesions / tumor

PEARLS

- Extremes of age (young and old) are prone to heat emergencies
- Predisposed by use of tricyclic antidepressants, phenothiazines, anticholinergic medications, alcohol, and MDMA (Ecstasy)

Hypotension and Shock

Medical Care

MANAGEMENT

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

Advanced Life Support

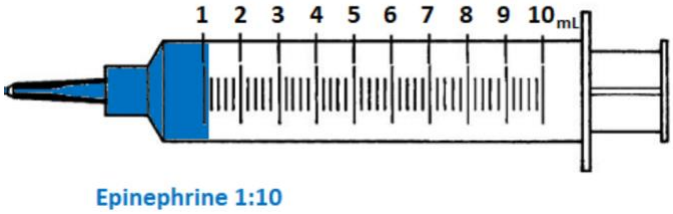
- Full ALS Assessment and Treatment. Refer to "Medical Assessment and Care" Protocol.
  - **ABC's**. Assess and maintain airway, oxygenation, ventilation.
  - Record and monitor continuous SpO_2 saturation and waveform capnography. **Goal SpO_2 > 94%**
  - Control external hemorrhage (direct pressure, tourniquet placement)
- Do not delay transport for IV insertion
- Establish vascular access with two large bore IV / IO catheters
- 12 lead ECG to evaluate for arrhythmia.
- IV 0.9% NaCl en route (if no evidence of pulmonary edema)
  - Administer 250 mL boluses until systolic BP > 90 mmHg
  - Total amount of IVF should not exceed 2000 mL (1000 mL for hemorrhagic shock)
  - Boluses may be given in rapid succession if systolic BP remains < 90 mmHg
  - Reassess vital signs every 5 minutes for unstable patients to assess response
- If systolic BP remains < 90 mmHg after 4th fluid bolus (1000 mL) or development of pulmonary edema:
  - *Norepinephrine* 1 – 30 mcg/min infusion, titrate to maintain systolic BP > 90 mmHg
    - Indication: sepsis
  - *Epinephrine* 2 – 10 mcg/min infusion, titrate to maintain systolic BP > 90 mmHg
    - Indication: anaphylaxis, post-arrest, cardiogenic shock
  - *Dopamine* 5 – 20 mcg/kg/min infusion, titrate to maintain systolic BP > 90 mmHg
- Consider TXA 2 grams in 100 mL Normal Saline IV/IO over 5-10 minutes for **hemorrhagic shock secondary to trauma** if within 3 hours of injury or for **hemorrhagic shock secondary to severe postpartum bleeding** (refer to TXA Protocol)
- Continued reassessment and rapid transport
- NOTE: Epinephrine may be given **IV push ("push dose epi")** to treat transient or profound hemodynamic instability requiring immediate intervention while an infusion is set up. Limit IV push epinephrine to 2 doses and then utilize an infusion for sustained hemodynamic support.

Epinephrine				
Typical Duration	**Prepare by mixing**	**Concentration after mixing**	**Dose in mL**	**Dose in mcg**
5 – 10 min	0.1 mg cardiac epinephrine (1 mL of 1 mg/10 mL) with 9 mL NS	10 mcg/mL	**1 - 2 mL** q 3-5 min PRN	10 – 20 mcg q 3-5 min PRN

Diagram on following page

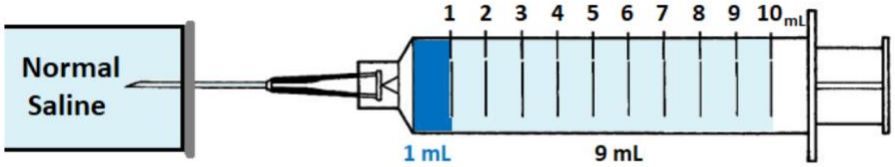
Push Dose Epi Visual Procedure

#1 – Take 1 mL of Epi 1:10 (cardiac epi)



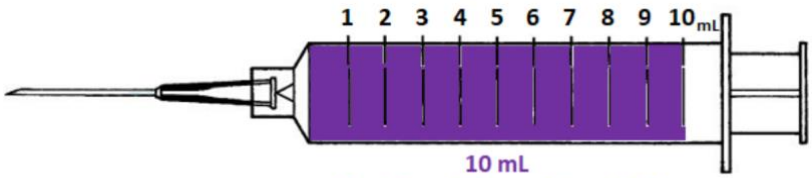
Epinephrine 1:10

#2 – Draw up 9 mL of normal saline



1 mL Epinephrine 1:10 | 9 mL Normal Saline

#3 – This creates 10 mL of Epi 1:100 (10 mL)

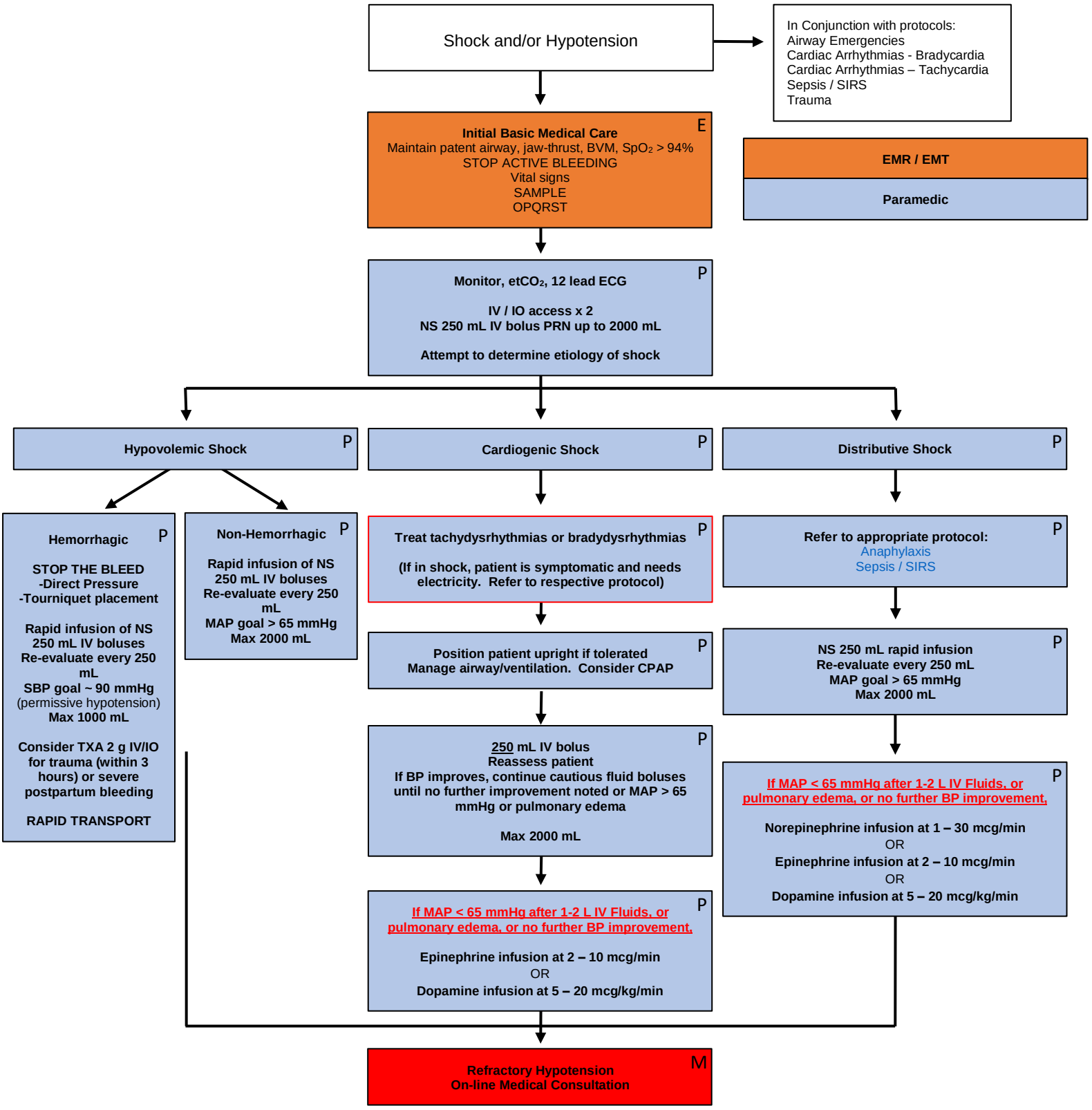


10 mL
"Push Dose" Epinephrine 1:100

#4 – Administer 1 – 2 mL every 3-5 min PRN for up to 2 doses

Hypotension and Shock

Medical Care



Hypotension and Shock

Medical Care

History	Signs and Symptoms	Differential:
• Blood loss • Fluid loss: vomiting, diarrhea, fever, burns • Infection • Cardiac ischemia • Medications • Allergic reaction • Pregnancy • History of poor oral intake	• Restlessness, confusion • Weakness, dizziness • Weak, rapid pulse • Pale, cool, clammy skin • Delayed capillary refill • Tachycardia, Tachypnea, Hypotension • Coffee-ground emesis • Melena	• Ectopic pregnancy • Dysrhythmias • Pulmonary embolism • Tension pneumothorax • Vasovagal • Medication effect/overdose • Physiologic • Sepsis

PEARLS

- Shock is inadequate blood perfusion to vital organs, resulting in decreased tissue oxygenation (i.e., oxygen demand exceeds oxygen supply). Sustained hypoperfusion leads to end organ damage and death.
- A systolic BP < 90 mmHg often heralds a shock state. Keep in mind that the average systolic BP for different patients can vary from 90 mmHg – 200 mmHg, therefore < 90 mmHg is not the cut-off value for <u>all</u> patients. It is important to look for other signs and symptoms of shock as noted below. Close evaluation and aggressive resuscitation are necessary to prevent further progression and death.

Identifying Shock

- Consider shock for all patients with evidence of:

Hypotension	Diaphoresis
Narrow pulse pressure	Cool, clammy skin
Tachypnea	Pallor
Tachycardia	Altered mental status
Delayed capillary refill	Decreased etCO_2
Mottled skin appearance	Hypoxia

- *Delayed capillary refill* is an early indicator of shock in the *pediatric* patient
- Signs and symptoms vary depending upon the stage of shock, which may be compensated (normal perfusion maintained) or decompensated (unable to maintain normal perfusion).
- Remember, hypotension is a result of the failure of the body's compensatory mechanisms. **Hypotension** may be a **late** stage of shock; the absence of hypotension does **not** rule out shock.

Differentiating Causes for Shock

- Shock may be caused by various causes. It is helpful and necessary to classify your hypotensive patient based on the following categories. Management and treatment vary for each category.
  - **Hypovolemic shock**: caused by decreased blood volume. Hypovolemic shock may be hemorrhagic (e.g., blood loss, trauma) or non-hemorrhagic (e.g., vomiting, diarrhea).
  - **Obstructive shock**: caused by the physical obstruction of blood returning to the heart. Examples include tension pneumothorax, massive pulmonary embolism, cardiac tamponade, and auto-PEEP (breath-stacking).
  - **Cardiogenic shock**: caused by cardiac pump failure, usually caused by massive MI or severe left ventricular failure.
  - **Distributive shock**: caused by the abnormal distribution of blood resulting from vasodilation, vasopermeability, or both, resulting in decreased overall intravascular volume. Examples include anaphylaxis (anaphylactic shock), sepsis (septic shock), or spinal cord injury (neurogenic shock).

ADDITIONAL INFORMATION / SPECIAL CONSIDERATIONS

Hypovolemic Shock

- Provide **immediate control** of external hemorrhage if possible. This is the cornerstone of treatment for hemorrhagic shock. Refer to "Trauma Assessment and Care" and "Control of External Bleeding" Protocols.
- A patient in hemorrhagic shock needs definitive care (i.e., blood transfusion, stopping the bleed, etc). **Rapid transport** to definitive care is crucial.

Classification of Hemorrhage				
	Class I	Class II	Class III	Class IV
Blood Loss (mL)	>750	750-1500	1500-2000	>2000
Blood Loss (% total)	>15	15-30	30-40	>40
Pulse Rate	<100	>100	>120	>140
Blood Pressure	Normal	Normal	↓	↓
Pulse Pressure	Normal or ↑	↓	↓	↓
Orthostasis	Absent	Minimal	Marked	Marked
Capillary Refill	Normal	Delayed	Delayed	Delayed
Respiratory Rate	14-20	20-30	30-40	>34
CNS mental status	Slight anxiety	Mild anxiety	Anxious/Confused	Confused/Lethargic

Obstructive Shock

- Assessment for obstructive shock should be an initial assessment priority for unstable patients. The presence of any of these factors can lead to death quickly. However, all have definitive treatment options and immediate recognition and management could be lifesaving.
- Treatment for these causes of obstructive shock should include:
  - Tension pneumothorax – see "Needle Thoracostomy" Procedure
  - Auto-PEEP as a result of mechanical ventilation – Patient removal from the ventilator and subsequent ventilator changes to increase expiratory time.

Distributive Shock

- Distributive shock results from vasodilation and may result from anaphylaxis, sepsis, or loss of sympathetic tone as a result of spinal cord transection or brain injury.
- **Fluid** resuscitation is the **first** priority for distributive shock.
- The first line vasopressor for septic shock should be *Norepinephrine*.
- If the septic shock patient is unresponsive to *Norepinephrine*, *Epinephrine* and *Dopamine* are the next vasopressors of choice.

Cardiogenic Shock

- Cardiogenic shock patients have a 50% mortality rate.
- The primary therapy for cardiogenic shock is to investigate for the presence of readily reversible causes of cardiogenic shock.
- Common reversible conditions include arrhythmias and STEMI.

Hypothermia

Medical Care

MANAGEMENT

Basic Life Support

- Establish patent airway, use jaw thrust, and bag-valve-mask ventilation as needed
- Administer oxygen as needed to maintain SpO_2 > 94%
- Record and monitor vital signs
- Obtain a SAMPLE history
- Evacuate patient from cold environment. Remove wet or cold clothing; wrap patient in blankets.
- Warm patient compartment
- Handle the patient very gently as the hypothermic heart is irritable; ventricular arrhythmias may result from rough treatment.
- If hypothermia injury is local (frostbite):
    - Handle injured part gently and leave uncovered
    - Do not allow the injured part to thaw if chance exists for the part to refreeze before arrival at a definitive care facility

Advanced Life Support

- Assess pulse over one minute before declaring it absent in any hypothermic patient
- Airway management
- If core temperature > 95°F
    - Vascular access
    - Utilize warm fluids if possible. Administer 0.9% Normal Saline at 250 mL/hr
    - Remove wet or cold clothing; wrap patient in blankets.
- If core temperature < 95°F
    - Obtain 12 lead ECG
    - Warming is the priority. Maintain core temperature with blankets.
    - Treat dysrhythmias (refer to appropriate dysrhythmia protocol)
    - If patient exhibits a decreased level of consciousness, refer to "Altered Mental Status" Protocol

PEARLS

- Handle the patient very gently as the hypothermic heart is irritable and ventricular arrhythmias may result from rough treatment.
- Severe bradycardia and low peripheral temperature may give appearance of death, so careful patient assessment is paramount.
- Termination of Resuscitation does not apply to this subset of patients.

Influenza like Illness

Medical Care

Background

This protocol provides guidance on protecting yourself in the workplace when caring for persons with suspected **COVID-19** (the 2019 Novel Coronavirus) as well as other respiratory illnesses.

General Respiratory Illness Precautions

Precautions for all lower respiratory illness patients (cough, fever, dyspnea):

- Mask (surgical mask or similar)
- Eye protection (goggles or face shield that fully covers the front and sides)
- Gloves and appropriate hand hygiene
- Place a simple facemask on the patient (unless treatment prohibits)
- Appropriate equipment decontamination

Minimize Aerosolization

- Procedures that aerosolize dramatically increase the spread of airborne viruses
    - Includes BVM, suctioning, endotracheal intubation, supraglottic airway placement, nebulized medication administration, CPAP/BIPAP, and CPR
- If **nebulized** medications are used for patients with moderate to severe distress with wheezing
    - If possible, perform nebulization **outside of the ambulance**
    - The use of N95 PPE is encouraged
- If an advanced airway is required, **I-Gel should be chosen over ET tube** to minimize exposure

Other Specific Precautions for Suspected ILI:

- Avoid touching one's face and unnecessary touching of surfaces in the ambulance
- Perform hand hygiene with soap and water (20 seconds or more)
- Doff PPE after transferring the patient at the receiving facility
- Be careful to prevent self-contamination while doffing PPE
- Perform full aerosol decontamination of the unit after the conclusion of the call

Other Useful Guidance:

- For patients requiring nasal cannula, place the cannula underneath the patient's mask
- For more information:
    - **www.cdc.gov/coronavirus**
    - **www.emsonline.net/Announcements/Infectious-Disease-Safety-Procedures.aspx** (PPE Donning, Doffing, and Hand-washing videos)

Left Ventricular Assist Devices (LVADs)

Medical Care

MANAGEMENT

General Approach to Patients with LVADs

Left Ventricular Assist Devices (LVADs) are surgically implanted circulatory support devices designed to assist the pumping action of the heart. Caring for these patients is complicated, and every effort should be made to contact the patient's primary caretaker (spouse, guardian, etc) and LVAD coordinator during your evaluation. Patients with properly functioning LVADs may not have a detectable pulse, normal blood pressure, or SpO_2.

- Treat non-LVAD associated conditions in accordance with the appropriate Levy County Department of Public Safety protocol
    - If patient meets **TRAUMA** or **STROKE ALERT** criteria, transport them to the appropriate receiving facility. Patients with LVADs are usually on anticoagulation, so consider transport to a Comprehensive Stroke Center (refer to "Cerebrovascular Accident (suspected)" Protocol)
    - If a patient meets **STEMI ALERT** criteria, transport them to UF Health (a PCI capable LVAD Center)
- Contact the patient's LVAD coordinator (if patient or caretaker does not have this information, look on the device for a phone number)
    - For any condition that is suspected to be related to the LVAD, transport to UF Health (LVAD Center)
- Always bring all available LVAD equipment to the ED with the transported patient

Basic Life Support

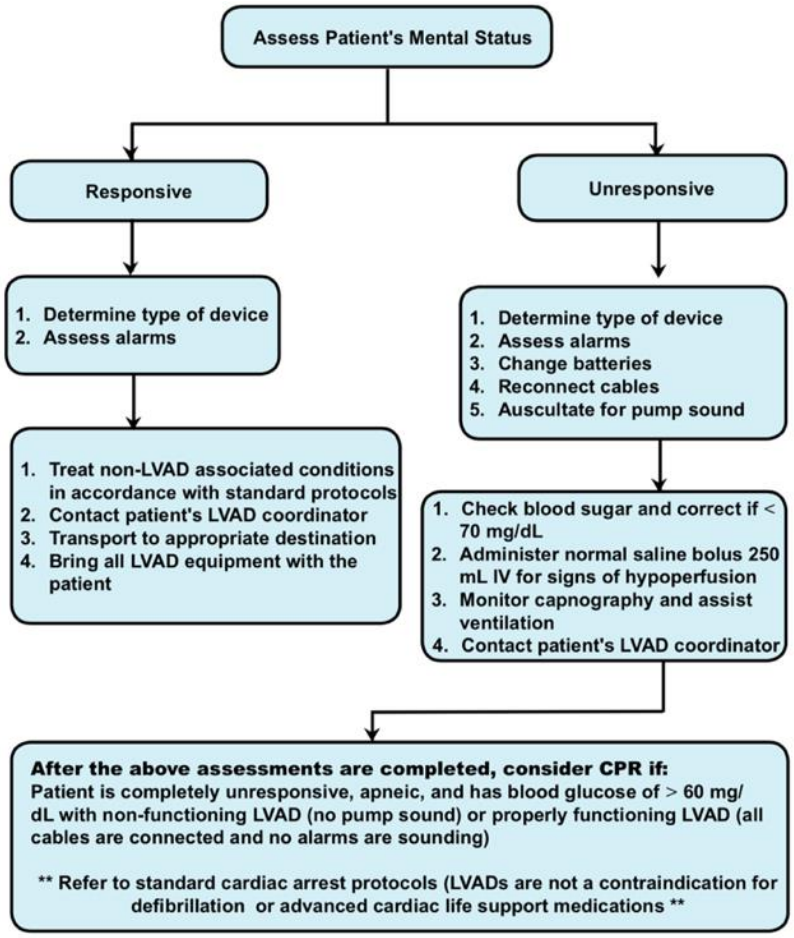
- Establish patent airway
- Supplemental 100% oxygen
- Obtain full set of vital signs. Record and monitor continuous SpO_2 saturation
- Record blood glucose level if any weakness, altered mental status, or history of diabetes
- Assist patient in replacing the device's batteries or cables
- Listen to heart sounds to see if device is functioning. If it is a continuous flow device, you will hear a whirring/whirling sound.
- Assess the device for any alarms. Look on the controller (usually found at the patient's waist) to see which device it is. Locate the colored sticker on the system controller and match this color to the EMS guide.
    - Intervene appropriately based on the type of alarm, device, and EMS guide.
- **If patient is unconscious, unresponsive to stimuli, and pulseless listen to the patient's chest. If you hear the whirring sound of the LVAD, DO NOT PERFORM CPR. The LVAD device has been surgically placed into the left ventricle and CPR could dislodge this device, causing death. If you cannot hear the device, then CPR should be performed per "Cardiac Arrest" Protocols.**

Advanced Life Support

- Full ALS Assessment and Treatment
- Monitor continuous waveform capnography to assess ventilation and perfusion
- Place patient on cardiac monitor. Treat dysrhythmias per protocols.
    - Keep in mind **that the presence of a VAD has no impact on the heart's electrical system** and arrhythmias should be treated per the protocol. Defibrillation can be performed on VAD patients without having to manipulate the external equipment. Remember that VAD patients with ventricular

arrhythmias may be conscious and alert because the pump is facilitating circulation. They will eventually decompensate, like any other patient.

- Administer boluses of 0.9% NaCl at 250 mL if signs of dehydration (e.g., tachycardia, dry mucous membranes, poor skin turgor) or MAP < 55 mmHg
    - Hold at 500 mL if no hypotension
    - If MAP < 55 mmHg, administer 0.9% NaCl at 250 mL until MAP > 65 mmHg
        - Contraindicated if evidence of congestive heart failure (e.g., rales, crackles)
- Evaluate unresponsive patients carefully for reversible causes prior to initiation of CPR – chest compressions may cause irreversible damage to devices
- Expedite transport and treat other conditions as per appropriate protocols
- Refer to device-specific protocols (Appendices)



Left Ventricular Assist Devices (LVADs)

Medical Care

PEARLS

- A ventricular assist device (VAD) is a mechanical pump that supports heart function and blood flow in people who have weakened hearts. The device takes blood from the lower chamber of the heart and helps pump it to the body and vital organs just as a healthy heart would.
- In a majority of these patients, a pulse will not be palpable. This occurs because the LVAD unloads the ventricle in a continuous fashion and therefore the aortic valve may not open with each contraction.
- A manual blood pressure may not be obtainable, but with an automated cuff you will obtain a pressure with a narrow pulse pressure. Assess the mean arterial pressure (MAP). In these patients, the normal range for mean arterial pressure is **MAP > 60 mmHg and < 90 mmHg.**
- Pulse oximetry may not be accurate due to the continuous flow nature of the LVAD.
- Above all else, please remember that these patients, along with their families, have been well trained in the care of themselves and their devices. Listen to them. Call the number on the device for the VAD coordinator on call. Patients always carry a “backup bag”, containing 2 extra fully charged batteries and a second controller. Please make sure to always bring this emergency backup equipment with them to the hospital.
- Bring the significant other or caretaker if possible to act as an expert on the device, especially if the patient is unconscious or unreliable.
- Please refer to appendix for further information on field care of these devices.

MANAGEMENT

General Considerations for Pregnant Patients

- Obtain a current pregnancy history:
  - Date of last menstrual period (LMP)? Approximate gestational age? Due date?
  - Has the water broken or gush of fluid from vagina? When? Appearance of fluid?
  - Time when contractions began?
  - How far apart are contractions?
  - How many times has she been pregnant?
  - Any prenatal problems? Any prenatal care? Known complications in this pregnancy?
  - Complications in previous pregnancies, abnormal presentation, multiple pregnancy, hemorrhage?
- Patients in the late 2nd or 3rd trimester (> 28 weeks) should be transported in a left lateral recumbent position (including those immobilized on a backboard) to avoid compression of the inferior vena cava by the gravid uterus

Childbirth

Delivery should only occur if imminent.

- **Document the following with a delivery:**
  - Presentation
  - Date and time of birth of baby and placenta
  - Gender of infant
  - Position of cord at delivery
  - Appearance of amniotic fluid (brown, green, clear)
  - Complications

Basic Life Support

- Notify dispatch immediately if patient may be in active labor.
- Instruct the patient not to push and not to go to the bathroom.
- Determine that delivery is imminent by assessing for the following signs:
  - Bulging perineum
  - Crowning (top of baby's head visible)
  - Contractions less than 2 minutes apart and reported as "strong" by mother
- Do not inspect or touch the patient's pelvis / vaginal areas unless delivery is imminent. Maintain privacy at all times. Have your partner present as a chaperone.
- Supplemental oxygen
- Do not place fingers or hand inside birth canal for assessment
- If presenting part is not the head (i.e., foot, arm, or buttock first), instruct the patient not to push. Notify dispatch immediately.
- If birth is imminent (baby is crowning), notify dispatch immediately
- Delivery:
  - Drape the patient's legs and abdomen with clean sheets

- Do NOT rupture an intact amniotic sac. Notify dispatch immediately if amniotic fluid is not clear or is foul-smelling
- Slow, controlled delivery of head; apply gentle perineal pressure
  - Support the infant's head as it emerges from the vagina
  - Protect the mother's perineum (the posterior aspect of the vagina) from friction or tearing
  - Do NOT push or pull on the head or any presenting part
  - Allow the head to rotate to one side
- Observe for meconium staining
  - Infants with meconium-stained amniotic fluid:
    - Do NOT routinely receive intrapartum suctioning; it should be based on their muscle tone and respiratory effort. Refer to "Neonatal Resuscitation" Protocol.
  - *Vigorous* infant with *good respiratory effort and muscle tone*:
    - Infant may stay with mother to receive initial steps of newborn care. Gentle clearing of meconium from the mouth and nose with bulb syringe may be done if necessary.
  - Infant with *poor muscle tone* and *inadequate breathing efforts*:
    - Initial resuscitation should be completed under the radiant warmer. Support oxygenation and ventilation as indicated for each infant. If the airway is obstructed, this may include intubation and suctioning:
    - Prior to ventilation, infants should be immediately intubated and meconium suctioned through the ETT until no more meconium is present. The infant may then be ventilated with positive pressure as indicated. Failure to clear the trachea before assisted or spontaneous ventilation will disseminate meconium through airways, severely impairing chances for survival.
  - Wipe any mucous from the infant's face with gauze
- If the umbilical cord is wrapped around the child's neck, gently unwrap/slip it over the head of the infant prior to completion of delivery. If unsuccessful, maintain one finger under the cord to alleviate pressure.
- Begin to deliver the infant's shoulder
  - Position your hands on either side of the infant's head
  - Exert **gentle** downward pressure as you deliver the anterior shoulder, then guide the head upwards and deliver the posterior shoulder
  - Be careful to securely grasp the infant, as he/she will be slippery
  - Keep the baby at a level equal to (or slightly below) the mother until the umbilical cord is clamped
- Following delivery, follow Neonatal Resuscitation protocol.
  - Stimulate breathing by rubbing the back or flicking the feet
  - Evaluate the newborn's ABCs and skin color. Administer oxygen, Bag-Valve-Mask (BVM) ventilation, chest compressions (if indicated)
- Dry and warm the newborn. Maintain body temperature
- Do **not** cut umbilical cord unless advised by EMS
  - Until the cord is clamped, the baby should be kept at the level of the mother's pelvis for blood flow. The baby can be placed on the mother's lower abdomen / pelvis for warmth.

- Record the time of delivery
- Allow spontaneous delivery of placenta, usually within 15 minutes of the infant.
  - Do not force the placenta to deliver. Do not apply traction to umbilical cord for placental delivery.
  - Signs of separation include: gush of blood from the vagina, lengthening of the umbilical cord, uterine fundus rising upward in the patient's abdomen, or uterus becoming firmer
- If placenta delivery occurs, place in biohazardous waste bag and hand to hospital staff upon arrival
- Massaging the uterus and/or allowing baby to nurse may facilitate uterine contractions and delivery of the placenta.
- Massage uterine fundus as soon as it shows signs of relaxing
- Check the patient's vaginal and perineal area for excessive bleeding.

- Postpartum:
  - Reassess vital signs and communicate with mother.
  - Refer to Neonatal Resuscitation protocol
    - Reassess ABCs. Stimulate again if breathing poorly
    - Suction as needed
    - Keep the newborn warm, dry, swaddled, head covered
    - Administer oxygen, Bag-Valve-Mask (BVM) ventilation, chest compressions (if indicated)
  - Assess for postpartum hemorrhage
  - Gently massage abdominal wall with palm (fingers extended) overlying the uterine fundus until firm
  - May consider TXA 2 grams IV/IO in 100 mL Normal Saline over 5-10 minutes for hemorrhagic shock secondary to severe postpartum hemorrhage (refer to TXA Protocol)

Advanced Life Support

- Transport to nearest OB receiving facility
- Refer to Neonatal Resuscitation protocol
- Clamp the cord in two locations (minimum of 6-8 inches away from the baby).
  - Position the clamps one inch apart.
  - Cut cord with scalpel or scissors.
  - Remember not to cut the cord too close to the infant – it can always be made shorter later
- If patient becomes hypotensive, refer to "Hypotension and Shock" Protocol

Pre-eclampsia and Eclampsia

- Pregnancy induced hypertension, pre-eclampsia, and eclampsia are conditions typically encountered in late 2nd or 3rd trimester pregnancy, and in the postpartum period.
- Clinical manifestations may include elevated BP (BP > 140/90 mmHg), headache, confusion, agitation, abdominal pain, proteinuria, peripheral edema, or seizures.
- Mild hypertension (diastolic BP < 100 mmHg) usually causes no symptoms
- Severe hypertension (diastolic BP > 110 mmHg) may cause:
  - Headache
  - Visual disturbance
  - Upper abdominal pain

  - Jaundice
  - Bruises
  - Pulmonary edema
- Pre-eclampsia is defined as BP > 140/90 mmHg, proteinuria, and peripheral edema
- Eclampsia is defined as pre-eclampsia with **seizures**

Advanced Life Support

- Full ALS Assessment and Treatment
- Seizure precautions and attempt to prevent maternal injury.
- If the patient is **≥ 20 weeks** pregnant or post-partum (up to 6 weeks), administer *Magnesium Sulfate* 4 grams IV over 10 minutes for either of the following:
  - Active seizures
  - Systolic BP > 160 mmHg or diastolic BP > 120 mmHg on two readings
- Initiate *Magnesium Sulfate* infusion (1 gram IV over 1 hour transport)
- If already receiving *Magnesium Sulfate* when seizure occurs, give an additional *Magnesium Sulfate* 2 gram IV bolus
- Caution: *Magnesium Sulfate* infusions may cause respiratory depression. Monitor airway closely.
  - **Monitor airway, blood pressure, respiratory rate, and fetal heart rate (FHR) (if able)**
- If severe hypertension (BP > 160/120 mmHg) persists despite *Magnesium Sulfate*, refer to "Hypertensive Emergencies" Protocol
  - Caution: Lowering blood pressure < 150/100 mmHg may compromise fetal-placental blood flow
- If patient is **< 20 weeks** pregnant and BP > 160/120, contact Medical Direction for orders
- For active seizures, administer *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg IV
  - If seizures continue or re-occur, repeat *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg IV; wait at least 5 minutes from initial dose
  - Alternative**:** *Lorazepam* (Ativan) 2 mg IV **OR** 2 mg IM
  - Do NOT delay treatment to obtain intravenous access, begin with IM dose unless IV is already established
- Blood glucose measurement
  - If < 70 mg/dL, administer *Dextrose 50%* 25 gm Slow IV
  - See "Diabetic Emergencies" Protocol for additional details
- Transport patient in 15° left lateral decubitus (right side tilted up 15°). Transport expeditiously

Prolapsed Umbilical Cord

Advanced Life Support

- Airway management, vascular access
- Monitor fetal heart rate (FHR) abdominally and indicate time accurately
- Position patient in 15° left lateral decubitus position, with knees flexed and pulled up towards chest
- Instruct mother to pant, and **not to push** during contractions
- Insert **sterile** gloved hand into vagina and elevate the presenting fetal part to prevent cord compression
- **Leave hand in place** and avoid touching cord

- Cover exposed cord with sterile gauze moistened with normal saline
- If crowning noted, prepare to assist with vaginal delivery
- If delivery is **inevitable** prior to arrival at the hospital, attempt gentle manual replacement of cord into the uterus. This should only be done just prior to actual delivery, or on the advice of Medical Direction
- Consider contacting Medical Direction for *Magnesium Sulfate* 1-5 grams IV over 30 minutes as an option to slow contractions

Suspected Ectopic Pregnancy

- Ectopic pregnancy should be a consideration in any woman of child-bearing age presenting with abdominal pain, pelvic pain, hypotension, or syncope.

Advanced Life Support

- Vascular access x 2
- Keep accurate count of used perineal pads
- Save any clots or tissue expelled for examination by physician upon arrival at receiving facility
- If signs of shock are noted, refer to "Hypotension and Shock" Protocol
- Transport expeditiously

Special considerations in suspected ectopic pregnancy:

- **Warning signs of an undiagnosed ectopic pregnancy**
  - Previous recent visits to the ED or physician's office with menstrual irregularity and/or mild abdominal pain with no diagnosis being made
  - May complain of abdominal pain and/or vaginal bleeding
- **Warning signs of a ruptured ectopic pregnancy**
  - Increased abdominal or pelvic pain
  - Dizziness, fainting
  - Pain radiating to the shoulder from pelvic area
- **Physical examination findings may include:**
  - Abdominal bruising, distention, tenderness, guarding, rebound tenderness, rigidity, decreased bowel sounds, or presence of a pulsating mass
  - Emesis: obtain history on the amount and type – ingested food, bloody, bilious, feculent (looks and smells like stool)
  - Ruptured ectopic pregnancy:
    - May present as a pale, diaphoretic, distressed woman with a weak, fast pulse
    - May have orthostatic hypotension

Vaginal Bleeding

- Vaginal bleeding could be anything from benign menses to a life-threatening bleed. Possible causes include: ectopic pregnancy, spontaneous abortion, placental abruption, dysfunctional uterine bleeding, traumatic vaginal laceration, bloody show prior to delivery, or the initial presentation of placenta previa. All of these patients should be closely monitored and evaluated in the emergency department with further diagnostic testing.

- A visual inspection of the vaginal area to look for crowning or presenting parts is appropriate, but do not place fingers or hand inside birth canal during assessment
- 1st or 2nd Trimester or unknown pregnancy status
    - Position of comfort
- 3rd Trimester Bleeding (> 28 weeks)
    - Lateral recumbent position
- Two saturated pads are equivalent to one pint (~250 mL) of blood loss.

Basic Life Support

- Ascertain date of Last Menstrual Period (LMP)

Advanced Life Support

- Full ALS Assessment and Treatment
- Airway management, Vascular access, Cardiac monitor
- Attempt to obtain fetal heart tones (FHT) if pregnancy is estimated greater than 10 weeks
- If gestational age known to be < 20 weeks, transport to closest hospital
- If gestational age known or possibly > 20 weeks, transport to closest OB receiving facility
- **Transport any products of conception or fetal material present at the scene to the receiving facility**
- **DO NOT** allow anyone to perform a vaginal or rectal examination of the patient. Vaginal bleeding may markedly increase
- If hypotensive, refer to "Hypotension and Shock" Protocol
    - TXA is **only** indicated for hemorrhagic shock in the setting of **postpartum (after delivery) hemorrhage**
- If in active labor, refer to "Childbirth" Protocol
- Keep accurate count of used perineal pads
- Transport expeditiously

Obstetrical Transport Destination

Medical Care

If delivery is not imminent, transport to patient's requested obstetric (OB) receiving facility.

Patient known to be < 20 weeks gestation:

- 1st day of last menstrual period < 20 weeks ago
- Available information (e.g., known due date) verifying gestational age < 20 weeks
- Transport to closest emergency department

Patient known or possibly ≥ 20 weeks gestation:

- Imminent delivery or medically unstable mother
  - Transport to nearest ED
- ***Non-traumatic*** abdominal, pelvic, or back complaints; vaginal bleeding / spotting or any vaginal fluid leak or discharge
  - Transport to closest OB receiving facility
    - Patient's preference should be considered if condition allows
    - Includes minor trauma patients

Pregnancy and trauma:

- Transport pregnant patients meeting **TRAUMA ALERT** criteria to:
  - Ocala Regional Medical Center — Level II — 1431 SW 1st Ave, Ocala
  - UF Health — Level I — 1515 SW Archer Rd, Gainesville
- If < 20 weeks gestational age, minor trauma patients can be transported to nearest ED

Overdose / Poisonings

Medical Care

MANAGEMENT

Determine the agent involved, the time of the ingestion / exposure, and the amount ingested. Determine the circumstances of the event, and document all details of the event. Bring empty pill bottles, etc., to the receiving facility. Give nothing by mouth unless specified in protocol or directed by the Regional Poison Control Center.

Basic Life Support

- If patient with decreased level of consciousness, perform blood glucose check.
  - If abnormal, refer to "Altered Mental Status" and "Diabetic Emergencies" Protocols
- Provide emesis bag or basin to patient if nausea or vomiting
- Ensure patient is able to protect airway if vomiting occurs.

Advanced Life Support

- Airway management
- Vascular access
- For hypotension (systolic BP < 90 mmHg), initiate 0.9% NS boluses of 250 mL increments to maintain systolic BP > 90 mmHg
  - Total amount of IVF should not exceed 2000 mL
  - If hypotension (systolic BP < 90 mmHg) despite fluid boluses, or fluid boluses are contraindicated, refer to "Hypotension and Shock" Protocol
- If wide QRS complex (> 0.12 seconds), hypotension, or any arrhythmias:
  - *Sodium Bicarbonate* 1 mEq/kg IV
  - Repeat *Sodium Bicarbonate* 1 mEq/kg IV in 5 to 10 minutes
- If any of the following conditions occur, refer to the appropriate protocols:
  - Altered Mental Status
  - Cardiac Arrhythmias – Wide Complex Tachycardia
  - Seizure
  - Syncope
- Transport patient expeditiously
- There is concern with any overdose patient that there could be suicidal attempt; therefore, all of these patients should be transported and, if necessary, law enforcement involved. These patients are not allowed to refuse transport due to our concerns about their intentions and capacity to refuse.

Cholinergic Poisoning / Organophosphates

Organophosphates cause acetylcholinesterase inhibition, resulting in signs and symptoms such as pinpoint pupils, eye pain, sweating, drooling, tearing, vomiting, seizures, and respiratory distress. Examples of commonly used organophosphate pesticides:

- Acephate (Orthene®)
- Azinphos-methyl (Azinphos®, Guthion®)
- Chlorpyrifos (Govern®, Lorsban®, Nufos®, Warhawk®, Whirlwind®)
- Diazinon
- Dimethoate (Cygon®)
- Disulfoton (Di-Syston®)
- Ethoprop (Mocap®)

- Fenamiphos (Nemacur®)
- Malathion (Fyfanon®)
- Methamidophos (Monitor®)
- Methidathion (Supracide®)
- Methyl parathion (Penncap-M®)
- Naled (Dibrom®)
- Oxydemeton-methyl (MSR®)
- Phorate (Thimet®)
- Phosmet (Imidan®)
- Profenofos (Curacron®)

Nerve agent chemical weapons such as *Sarin*, *Soman*, *Tabun*, and *VX* are also organophosphates and should be treated accordingly.

Basic Life Support

- Toxicity to crew may result from inhalation or topical exposure. Any patient with dermal exposure **MUST** be adequately decontaminated prior to transport.
- Initiate **HAZMAT ALERT** if indicated
- Wear protective clothing including masks, gloves, and eye protection
  - Toxicity to ambulance crew may result from inhalation or topical exposure
  - Remove all clothing and contain run-off of toxic chemicals when flushing
- Supplemental 100% oxygen

Advanced Life Support

- Full ALS Assessment and Treatment
- If signs of severe toxicity (severe respiratory distress, bradycardia, heavy respiratory secretions, nausea, vomiting, diarrhea, salivation, lacrimation, bradycardia, diaphoresis, wheezing, fasciculations, confusion, seizures – do not rely on pupil constriction to diagnose or to titrate medications):
  - *Atropine 2 mg* IV/IO. Repeat by doubling dose every 3 min if previous dose did not induce response. Titrate to bronchial secretions.
- For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses, or when fluid boluses are contraindicated:
  - *Norepinephrine* 1 – 30 mcg/min infusion, titrate to maintain systolic BP > 90 mmHg
  - *Epinephrine* 2 – 10 mcg/min infusion, titrate to maintain systolic BP > 90 mmHg
  - *Dopamine* 5 – 20 mcg/kg/min infusion, titrate to maintain systolic BP > 90 mmHg
- If any of the following conditions occur, refer to the appropriate protocols:
  - Altered Mental Status
  - Seizures

Antipsychotics / Acute Dystonic Reaction

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

- Haloperidol (Haldol)
- Prolixin
- Thorazine
- Prochlorperazine (Compazine)
- Promethazine (Phenergan)
- Ziprasidone (Geodon)

Advanced Life Support

- Full ALS Assessment and Treatment

- For Dystonic reactions, administer *Diphenhydramine* (Benadryl) 1 mg/kg IV (Max: 50 mg)
    - May be administered IM if no IV access available

Beta Blocker Toxicity

Examples of commonly used Beta Blocker medications:

- Atenolol (Tenormin)
- Corzide (Nadolol/bendroflumethlazide)
- Esmolol (Brevibloc)
- Inderide (Propranolol/HCTZ)
- Inderide LA (Propranolol/HCTZ)
- Labetolol (Trandate)
- Lopressor HCT (Metoprolol/HCTZ)
- Metroprolol (Lopressor)
- Nadolol (Corgard)
- Propranolol (Inderal)
- Tenoretic (Atenolol/Chlorthalidone)
- Timolide (Timolol/HCTZ)
- Timolol (Blocadren)
- Ziac (Bisoprolol/HCTZ)

Advanced Life Support

- Full ALS Assessment and Treatment
- For patients with cardiovascular toxicity, defined by:
        - Systolic BP < 90 mmHg
        - Altered mental status
        - Bradycardia
        - 2nd or 3rd degree heart block
    - Administer the following agents:
        - NS 250 mL boluses IV
        - *Atropine* 1 mg IV
            - Repeat every 3 minutes as needed (Max: 3 mg)
        - If no response, *Calcium Chloride* 1 gram IV
            - Contraindicated if patient taking digoxin (Lanoxin)
            - If no response, may repeat *Calcium Chloride* 1 gram IV
        - If no response, *Glucagon* 3 mg IV
            - If vomiting occurs after *Glucagon*, administer *Ondansetron* (Zofran), 4 mg slow IV
        - If no response, begin Transcutaneous Pacing

Calcium Channel Blocker Toxicity

Examples of commonly used Calcium Channel Blocker medications:

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

Advanced Life Support

- Full ALS Assessment and Treatment
- For patients with cardiovascular toxicity, defined by:
        - Systolic BP < 90 mmHg

        - Altered mental status
        - Bradycardia
        - 2nd or 3rd degree heart block
    - Administer the following agents:
        - NS 250 mL boluses IV
        - *Atropine* 1 mg IV
            - Repeat every 3 minutes as needed (Max: 3 mg)
        - If no response, *Calcium Chloride* 1 gram IV
            - Contraindicated if patient taking digoxin (Lanoxin)
            - If no response, may repeat *Calcium Chloride* 1 gram IV
        - If no response, *Glucagon* 3 mg IV
            - If vomiting occurs after *Glucagon*, administer *Ondansetron* (Zofran), 4 mg slow IV
        - If no response, begin Transcutaneous Pacing

Carbon Monoxide and Cyanide

Basic Life Support

- Remove the patient from the contamination source
- Supplemental 100% oxygen by NRB / BVM regardless of SpO_2; document time oxygen started
    - Note that Carbon Monoxide (CO) and Cyanide (CN) poisoning may be present even if SpO_2 of 100%
- Minimize patient motion
- Prepare suction equipment for possible vomiting
- Full set of vital signs

Advanced Life Support

- Full ALS Assessment and Treatment
- If available, immediately treat empirically with *Hydroxocobalamin* 5 g in 200 mL NS (Cyanokit) to bind CN (Pediatric *Hydroxocobalamin* 70 mg/kg IV x 1).
    - If unavailable, use Cyanide Antidote Kit (as below)
- For smoke inhalation patients, also consider Cyanide poisoning (see "Hazardous Materials Exposure-HAZMAT ALERT" Protocol)

Pearls:

- Inhaled combustion byproducts can cause symptoms as mild as a headache and nausea or as severe as complete cardiovascular and central nervous system collapse.
- Suspect carbon monoxide (CO) and cyanide (CN) toxicity in patients with smoke exposure in enclosed spaces.
- Multiple family members and household pets acting lethargic or inappropriate can be a clue to CO poisoning
- Carbon monoxide poisoning:
    - Suspect CO poisoning if multiple people have similar symptoms when in the presence of combustion in an enclosed area (e.g., in a trailer with a fuel space heater).
    - Symptoms of mild CO poisoning include headache, nausea, flushing, and dyspnea
    - Half-life of CO is drastically shortened by administration of high-concentration oxygen
    - If severe poisoning, consider transport to facility with hyperbaric oxygen availability. Discuss with OLMD

- Cyanide poisoning:
  - Suspect CN poisoning if cardiovascular instability (hypotension) or severe altered mental status after exposure to smoke in an enclosed space (e.g., house fire)
  - If available, immediately treat empirically with *Hydroxocobalamin* 5 g in 200 mL NS (Cyanokit) to bind CN (Pediatric *Hydroxocobalamin* 70 mg/kg IV x 1)
  - If Cyanokit is unavailable, alternatively use *amyl nitrate*, *sodium nitrite*, and *sodium thiosulfate* kit (Cyanide Antidote Kit) if available. See package insert for adult and pediatric dosing.

Clonidine (Alpha-2 Adrenergic agonist) Overdose

Examples of commonly used alpha-2 adrenergic agonists:

- Clonidine (Catapres)
- Imidazoline

Advanced Life Support

- Full ALS Assessment and Treatment
- Toxidrome includes CNS depression, bradycardia, hypotension, respiratory depression, and small pupil size. For *severe* CNS or respiratory depression:
  - *Naloxone* (Narcan) 2 mg IV (start at 0.4 mg for patients over 65 years old)
    - *Naloxone* (Narcan) can be given in 0.4 mg increments, titrated to mental status and respiratory drive (monitor respiratory status with continuous capnography)
    - If respiratory depression persists, repeat every 3 minutes to a maximum of 8 mg
    - If IV access has not been established, *Naloxone* (Narcan) can be given IM or via Mucosal Atomizer Device

Cocaine and Sympathomimetic Overdose

Advanced Life Support

- Full ALS Assessment and Treatment
- For patients with sympathomimetic toxidrome (hypertension, tachycardia, agitation, mental status changes):
  - *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg IV
    - Repeat *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg IV if adequate sedation not achieved on initial dose
  - Alternative**:** *Lorazepam* (Ativan) 2 mg IV **OR** 2 mg IM
- If seizures occur, refer to "Seizure" Protocol

Digoxin (symptomatic)

Advanced Life Support

- Administer *Magnesium sulfate* 2 g IV

Opiate

Advanced Life Support

- If opiate overdose is suspected (altered mental status, pinpoint pupils, slow respirations, hypotension):

- *Naloxone* (Narcan) 2 mg IV (for patients over 65 years old, start at 0.4 mg)
  - *Naloxone* (Narcan) can be given in 0.4 mg increments, titrated to mental status and respiratory drive (monitor respiratory status with continuous capnography)
  - If respiratory depression persists, repeat *Naloxone* 0.4 mg every 3 minutes to a max of 8 mg
  - If IV access has not been established, *Naloxone* (Narcan) can be given IM or via Mucosal Atomizer Device
- If patient returns to baseline after *Naloxone*, further boluses may be necessary. Re-dose as needed to clinical effect (repeat doses every 3 minutes).
- Be prepared for a combative patient if patient has a history of opiate abuse (e.g., heroin addict). Be prepared for acute narcotic withdrawal syndrome if patient is opiate dependent (as this may precipitate seizures or delirium).
- ***Note: Patients presenting with altered mental status, and who respond to Narcan, are not candidates for informed refusal. Due to the short half-life of Narcan, these patients are medically incapacitated, and should be transported, regardless of the presence of an apparently normal mental status.***

Tricyclic and Tetracyclic Antidepressant Overdose

Examples of commonly used tricyclic antidepressants: Amitriptyline, Amoxapine, Desipramine, Doxepin

Advanced Life Support

- Full ALS Assessment and Treatment
- If wide QRS complex (≥ 0.12 sec), hypotension, or any arrhythmias:
  - *Sodium Bicarbonate* 1 mEq/kg IV
  - Repeat *Sodium Bicarbonate* 1 mEq/kg IV in 5 to 10 minutes
- For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses, or when fluid boluses are contraindicated:
  - *Norepinephrine* 1 – 30 mcg/min infusion, titrate to maintain systolic BP > 90 mmHg
  - *Epinephrine* 2 – 10 mcg/min infusion, titrate to maintain systolic BP > 90 mmHg
  - *Dopamine* 5 – 20 mcg/kg/min infusion, titrate to maintain systolic BP > 90 mmHg
- If any of the following conditions occur, refer to the appropriate protocols:
  - Polymorphic Ventricular Tachycardia. Beware of "slow VT" – Do not give amiodarone!
  - Altered mental status
  - Seizures

Pain Management

Medical Care

MANAGEMENT

Basic Life Support

- Assess baseline pain level (0-10 scale, 0 = No pain, 10 = Worst pain)
- Full set of vital signs

Advanced Life Support

- Evaluate the patient's chief complaint, history, physical exam, activity level, and vital signs to evaluate the patient's pain.
- Consider comfort measures such as ice, positioning, splinting in a position of comfort
- Contraindications to IV/IO/IN analgesia include:
    - Hypotension (systolic BP < 90 mmHg)
    - Altered mental status
    - Respiratory distress
    - Medication allergy
    - Pain is chronic
    - Pain is from headache
- Analgesic agents may be administered under standing orders for patients experiencing severe pain from any one of the following:
    - Isolated extremity injury:
        - Fractures / dislocations of the shoulder, upper extremity, hip, lower extremity
        - Animal bites or envenomations to the extremities
    - Burn without airway, breathing, or circulatory compromise
    - Sickle cell crisis with pain that is typical for that patient's disease
    - Dental pain
    - Severe back pain
    - Acute chest pain, in accordance with "Chest Pain" protocol (excluding Ketamine)
    - Acute abdominal pain, in accordance with "Abdominal Pain" protocol

Agents for Pain Control

- Use *one* of the following agents:
- *Fentanyl* (Sublimaze) 1 mcg/kg (max single dose: 100 mcg) slow IV/IO. May repeat after 10 minutes as needed for severe pain (max total dose: 200 mcg)
    - **OR** 100 mcg intranasal via MAD (divide dose equally between nostrils)
    - Contraindicated if systolic BP < 90 mmHg
    - Preferentially use intranasal delivery via MAD for those where IV access may be difficult to obtain in a timely fashion (extremity burns / injuries) or not indicated for chief complaint (stable dental or back pain)
- *Morphine* 1-5 mg IV; may repeat once after 10 minutes PRN (max total dose: 10 mg) if systolic BP > 100 mmHg
- *Ketamine* 0.1 – 0.3 mg/kg (max single dose: 30 mg) slow IV/IO (caution when systolic > 160 mmHg)
- After each drug dosage administration, reassess the patient fully:

- Reassess the patient's pain
- Note adequacy of ventilation and perfusion
- Assess full set of vital signs (**must** be repeated between doses of any medication)
- Monitor oxygen saturation and etCO_2

PEARLS

- Pain is one of the most common reasons that patients call for EMS. Adequate control of acute pain is encouraged. We often fail to adequately control pain in the prehospital and hospital setting for many reasons, including hemodynamic instability, concerns for addiction, alteration in mental status, drug reactions or allergies, and concerns that analgesic medications are controlled substances. However, when used judiciously, analgesic medicine in the prehospital setting can effectively control acute pain.
- Be aware that treatment of pain can alter a patient's mental status, decrease pain, decrease blood pressure, and lead to a false sense of safety to physicians in the ED. Please make sure they are aware of the patient's pain, including level of severity.

Police Custody / Patient Care Standards

Medical Care

MANAGEMENT

When called to a scene to assess a person in police custody, perform all assessments 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 LCDPS Protocols
- If the detained patient refuses transport, execute a standard refusal process as detailed in "Refusal of Service" 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 requests 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, obvious medical necessity, or not a candidate for refusal) adhere to the following:
    - Ensure that the LEO understands transport is indicated and that **medical clearance prior to incarceration is not a process performed by EMS**
    - Contact OLMD for further input and assistance as needed
    - If unable 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 using a Taser device. All patients should be evaluated for underlying medical, substance abuse, and/or psychiatric emergencies. All patients shall either be **transported** or a **waiver obtained**. If a patient exhibits abnormal vital signs, refusal is not an option, because these patients are high risk for excited delirium. Patients that have required forceful action to be subdued are at high risk for excited delirium; these patients have an association with sudden cardiac arrest and death. Also refer to any protocol that applies to underlying conditions (e.g., Behavioral Emergencies, Cocaine / Sympathomimetic Overdose, etc).

Basic Life Support

- Confirm scene safety with law enforcement. Approach the patient with caution.
- 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

- Confirm scene safety with LEO and approach the patient with caution
- Most sworn Law Enforcement personnel have been trained to remove taser probes. Probes that have penetrated a "sensitive area" such as the head, neck, spinal column, groin, or breast tissue in a female will not be removed by LEO and will require transport
- If the probes are embedded in an area not specified above and the patient appears stable, taser probes may be removed in the following manner:
    - Place one hand on the patient in the area where the probe is embedded to stabilize the skin around the puncture site. Place second hand firmly around the probe
    - In one fluid motion, pull the probe straight out of the puncture site; if resistance is met, leave probe in place and transport
    - Repeat procedure on remaining probe(s)
    - Handle probes as a bio-hazard sharp with the exception that the officer may request that the probe be turned over to him/her for entry as evidence
- **Do not delay transport if one or more of the following exist:**
    - Unconscious patient
    - Evidence of progressing excited delirium
    - Persistent abnormal vital signs
    - History / physical exam findings consistent with amphetamine / hallucinogenic drug use
    - Altered level of consciousness, aggressive or violent behavior
    - Evidence of hyperthermia
- 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 physical restraints, refer to the "Behavioral Emergencies" Protocol
- Transport patient supine or lateral recumbent position only
    - ***Patient transport in the prone position is contraindicated and will not be tolerated***

DUI Blood Draw

In accordance with Florida Statute 316.1933, law enforcement officers are authorized to use reasonable force if necessary to obtain a DUI blood test from a driver involved in a motor vehicle collision resulting in death or serious bodily injury. *Paramedics are authorized to act on a LEO's request for a blood draw, regardless of patient consent, provided there is no delay in patient care and / or transport.*

When asked to draw blood for this purpose, use the DUI blood kit provided by the officer. These scenarios are considered patient encounters, and all EMS documentation requirements and protocols are to be observed.

Sedative Agent Use

Medical Care

MANAGEMENT

It is not always possible to predict how patients will respond to receiving a sedative medication. This protocol is to be used in conjunction with any protocol that involves the use of medication which may result in sedation. Authorized medications that may result in sedation are *Diphenhydramine*, *Fentanyl*, *Haloperidol, Ketamine*, *Lorazepam*, *Midazolam*, and *Morphine*.

Minimal Sedation

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

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.

Unless the patient is intubated, sedative agent dosage and use should ideally result in minimal sedation only.

It is important to emphasize that outside of intubation, behavioral emergencies, and cardioversion, the primary goal for the above medications should NOT be sedation. The medications above may result in sedation, but the primary goal should NOT be sedation. Sedation (aka conscious sedation or procedural sedation) is a highly resource-intensive procedure that should only be performed within the hospital.

Advanced Life Support

- Continuously monitor the following:
  - Patency of airway
  - Vital signs
  - Oxygen saturation and continuous waveform 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

Seizure

Medical Care

MANAGEMENT

Basic Life Support

- For active seizures, supplemental 100% oxygen via NRB. Be prepared to support ventilation with BVM
  - Suction mouth as needed
- Nasal cannula is sufficient if no active seizures and no respiratory signs or symptoms
- Protect patient from injury
  - Assess possibility of trauma. Apply cervical collar and maintain spinal immobilization if any concern exists regarding spinal trauma.
- Full set of vital signs. Blood glucose measurement
- Questions to ask: history of seizures, compliance with medications, how many seizures, time between seizures, return to normal mental status between seizures, possible trauma?

Advanced Life Support

- Full ALS Assessment and Treatment
- Blood glucose measurement
  - If < 70 mg/dL, treat per "Altered Mental Status", "Diabetic Emergencies" Protocol
- For active seizures, do NOT delay treatment to obtain IV access, begin with IM dose unless IV is already established
- Administer *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg IV
  - If seizures continue or re-occur, repeat once *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg IV; wait at least 5 minutes between doses
  - Alternative**:** *Lorazepam* (Ativan) 2 mg IV **OR** 2 mg IM. May repeat once in 5 minutes up to total of 4 mg if seizure activity continues)
- Be prepared for airway problems and continued seizures. Be prepared to assist ventilations, especially if *Midazolam* (Versed) or *Lorazepam* (Ativan) is used
- 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
- If seizure occurs in the setting of poisoning, refer to "Overdose / Poisonings" Protocol.
- If the patient is ≥ **20 weeks** pregnant or post-partum (up to 6 weeks), refer to "Obstetric and Gynecological Emergencies" Protocol.
- If patient becomes combative or agitated in the **post-ictal state** (after seizure resolution):
  - Apply physical restraints as needed to ensure patient/crew safety (only as directed in "Behavioral Emergencies" Protocol)
  - If chemical restraints are required:
    - *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg IV (total maximum dose **including treatment for seizures** is 10 mg IM/intranasal or 5 mg IV)
    - Do NOT treat with *Haloperidol* (Haldol), use is contraindicated in these patients
    - Contact OLMD for further orders

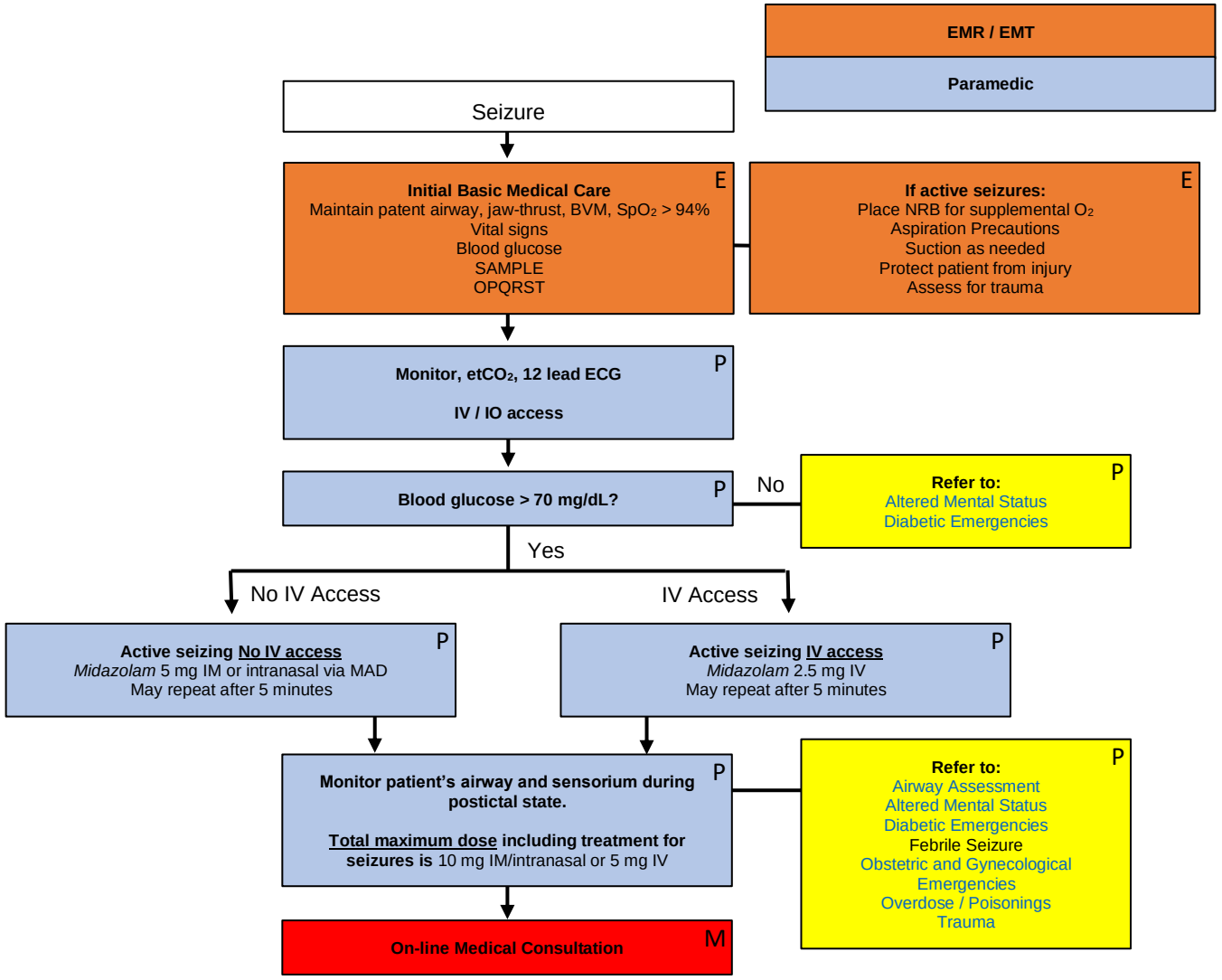
***Diazepam* rectal gel (Diastat®)**

Seizure

Medical Care

Some patients with a diagnosed seizure disorder will have their own *Diazepam* rectal gel (Diastat®) prescribed by their physician. When available, Diastat® can be given if no IV is available. Use the patient's prescribed dose or refer to the table below. If an IV is readily available, *Midazolam* (Versed) is the preferred medication.

For patients > 12 years old (0.2 mg/kg)		
Weight		**Dose**
(kg)	**(lbs)**	**(mg)**
14-27	30-60	5
28-50	61-111	10
51-75	112-166	15
76-111	167-244	20



Seizure

Medical Care

History	Signs and Symptoms	Differential:
• Reported/witnessed seizure • Number of seizures, how much time between seizures, return to baseline between seizures • Seizure history • Medical alert tag information • Seizure medications • History of trauma • History of diabetes • History of pregnancy	• Decreased mental status • Sleepiness • Incontinence • Observed seizures • Evidence of trauma • Unconscious	• CNS trauma • Tumor • Hypoxia • Electrolyte abnormality • Drugs, medications • Infection/fever • Alcohol withdrawal • Eclampsia • Stroke • Hyperthermia • Hypoglycemia

PEARLS

- Seizures have many underlying causes which can be difficult to ascertain in the field. The primary concern with these patients is (1) **airway protection** and (2) **cessation of the seizures** to prevent further neurological damage. History is extremely helpful in deciding disposition in the emergency department so on-scene information is very important.
- **Status epilepticus** is defined as a seizure that lasts longer than 15 minutes, or greater than two successive seizures without a period of consciousness or recovery. This is a *true emergency* requiring rapid airway control, treatment, and transport.
- It is important to know how many times a patient seized, time between seizures, and if they had a normal mental status in between seizures. Please document and report verbally on arrival to the emergency department.
- Types of seizure:
    - **Grand mal seizures** (generalized) – associated with loss of consciousness, incontinence, tongue trauma
    - **Petit mal seizures** (focal) – affect only a part of the body, not usually associated with loss of consciousness
    - **Jacksonian seizures** – seizure which start as a focal seizure and become generalized, grand mal
- Seizures can be a sign of a closed head injury

Adult GCS					
Motor Response		**Verbal Response**		**Eye Opening**	
Obeys Commands	6	Oriented	5	Spontaneous	4
Localizes	5	Confused	4	To voice	3
Withdrawal	4	Inappropriate	3	To pain	2
Flexion	3	Incomprehensible	2	None	1
Extension	2	None	1		
None	1				

Sepsis / SIRS

Medical Care

MANAGEMENT

Sepsis is a rapidly progressing, life-threatening condition due to systemic infection. Sepsis must be recognized early and treated aggressively to prevent progression to shock and death. Sepsis can be identified when the following markers of the Systemic Inflammatory Response Syndrome (SIRS) are present **AND** the patient has suspected infection:

- Temperature ≥ 38° C (100.4° F) OR ≤ 36° C (96.8° F)
- Respiratory Rate ≥ 20 breaths/min
- Heart Rate ≥ 90 beats/min

In addition to physiologic markers of SIRS, severe sepsis may cause hypoxia and inadequate organ perfusion, resulting in metabolic acidosis marked by elevated blood lactate levels and decreased $etCO_2$ levels (measured by capnography).

SEPSIS ALERT

The purpose of a **SEPSIS ALERT** is to provide pre-arrival ED notification in order to facilitate rapid assessment and treatment of a suspected severe sepsis patient.

A **SEPSIS ALERT** will be instituted for patients meeting the following **3** criteria:

- Suspected infection
- Two or more of the following:
  - Temperature ≥ 38° C (100.4° F) OR ≤ 36° C (96.8° F)
  - Respiratory Rate ≥ 20 breaths/min
  - Heart Rate ≥ 90 beats/min
- Any sign of end-organ damage (see table) or systolic BP < 90 mmHg

Signs of End-Organ Damage

- $etCO_2$ ≤ 25 mmHg OR Lactate > 4 mMol
- Systolic BP < 90 mmHg
- Modified shock index less than 0.7 or greater than 1.3 *Note: Modified shock index = Heart rate / MAP*
- Neurological (AMS, coma, agitation, lethargy, stupor)
- Respiratory (hypoxia, bilateral diffuse infiltrates, respiratory failure)
- Cardiac (poor capillary refill, EKG changes, pulmonary edema)
- Hepatobiliary (elevated LFTs, elevated lactate, DIC)
- Renal (decreased urination, increase in creatinine)
- If a paramedic has concerns that the patient has progressed to severe sepsis, but does not meet SEPSIS ALERT criteria, a **SEPSIS ALERT** may be called

Basic Life Support

- Supplemental oxygen to maintain SpO_2 > 94%
- Establish patent airway, use bag-valve-mask ventilation as needed
- Record and monitor all vital signs
- Check blood glucose level if any weakness, altered mental status, or history of diabetes

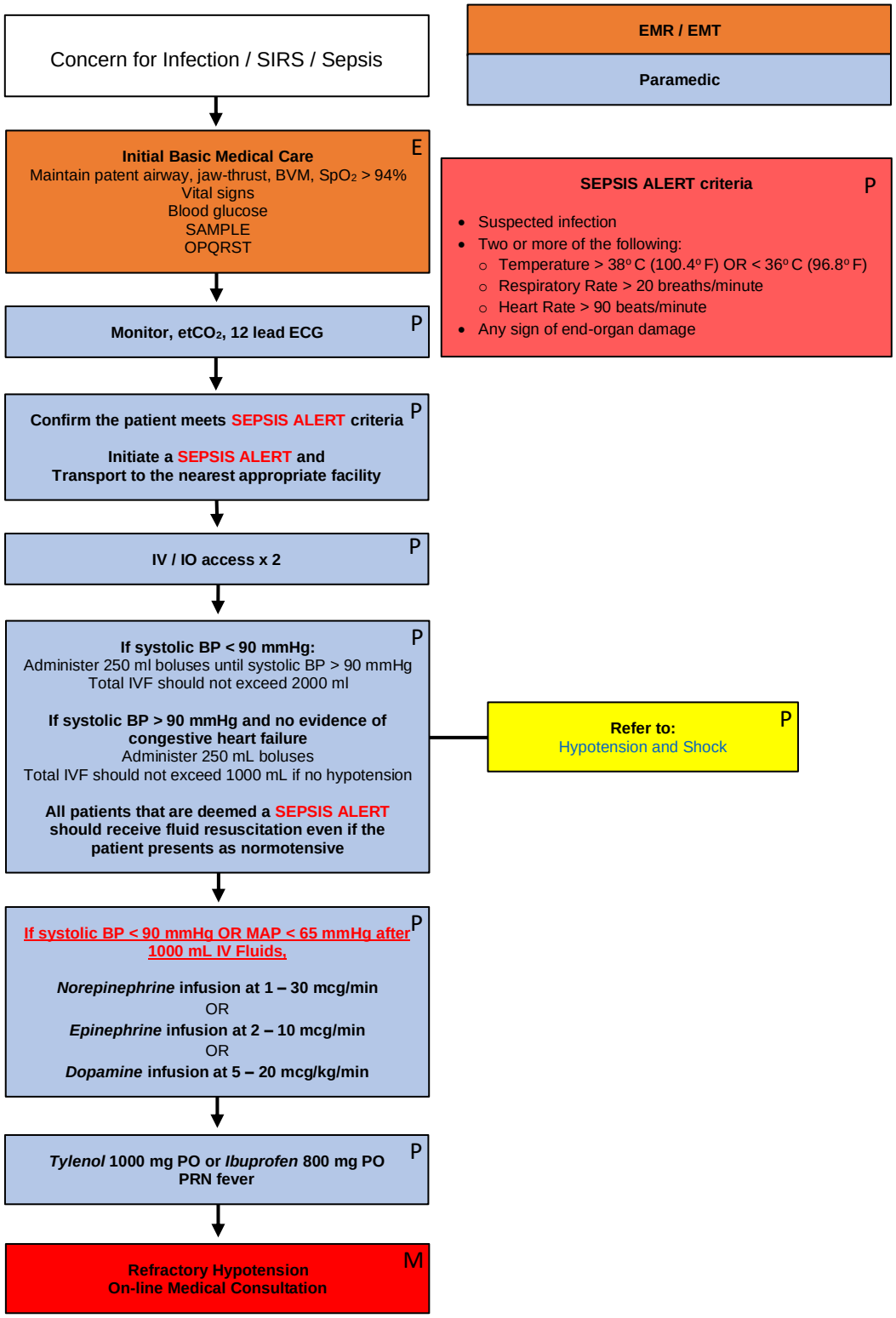
Advanced Life Support

- Full ALS Assessment and Treatment
- Cardiac monitoring. 12 lead ECG. **Obtain an $etCO_2$ level and monitor changes**
- Notify hospital of incoming **SEPSIS ALERT** prior to arrival
- IV 0.9% NaCl en route
  - If systolic BP < 90 mmHg:
    - Administer 250 ml boluses until systolic BP > 90 mmHg
    - Boluses may be given in rapid succession if systolic BP remains < 90 mmHg

        - Total amount of IVF should not exceed 2000 ml
    - If systolic BP > 90 mmHg and no evidence of congestive heart failure (i.e., rales, JVD, etc.)
        - Administer 250 mL boluses (hold at 1000 mL total if no hypotension).
        - All patients that are deemed a **SEPSIS ALERT** should receive fluid resuscitation even if the patient presents as normotensive.
    - Repeat vital signs after each bolus.
- If Temperature ≥ 38° C (100.4° F) and patient is capable of swallowing without concern of airway compromise
    - Administer *Acetaminophen* (Tylenol) 1000 mg PO x 1 **OR** *Ibuprofen* 800 mg PO x 1
- If systolic BP remains < 90 mmHg **OR** MAP < 65mmHg after 4th fluid bolus (1000 ml):
    - *Norepinephrine* 1 – 30 mcg/min infusion, titrate to maintain systolic BP > 90 mmHg, preferred
    - *Epinephrine* 2 – 10 mcg/min infusion, titrate to maintain systolic BP > 90 mmHg
    - *Dopamine* 5 – 20 mcg/kg/min infusion, titrate to maintain systolic BP > 90 mmHg
    - The first line vasopressor for septic shock should be *Norepinephrine*. If the septic shock patient is unresponsive to *Norepinephrine*, *Epinephrine* and *Dopamine* are the next vasopressors of choice.
    - Refer to "Hypotension and Shock" Protocol
- Expedite transport to the nearest appropriate facility. Ensure Emergency Department staff are made aware of your concerns of sepsis

Sepsis / SIRS

Medical Care



Sepsis / SIRS

Medical Care

History	Signs and Symptoms	Differential:
• Medications • Infection • Indwelling catheters • Immunocompromised patients (e.g., cancer, sickle cell, nursing home, low WBC, HIV) • Burns • Open wounds • Fluid loss: vomiting, diarrhea, fever	• Confusion • High fever • Tachypnea • Tachycardia • Low blood pressure • Rash	• Acute renal failure • Acute respiratory distress syndrome • Adrenal insufficiency and adrenal crisis • Diabetic ketoacidosis • Drug overdose • Heatstroke • Pulmonary embolism • Pneumonia • Shock • Toxins • UTI

PEARLS

- **Systemic Inflammatory Response Syndrome (SIRS)** refers to bodily inflammation in response to a nonspecific insult (e.g., ischemia, inflammation, infection, trauma, or any combination)

- Consider at-risk patients. These include:
  - Chronic illnesses: history of dialysis, chemotherapy
  - Residing in a long-term care facility
  - Current or recent infections
  - Current or recent antibiotics
  - History of recent surgical procedure
  - Patients with indwelling hardware

- Take into consideration patients who are on calcium channel blockers or beta blockers who cannot mount a tachycardic response. These patients will exhibit a normal heart rate after progressing into sepsis.

- If patient has evidence of congestive heart failure exacerbation, aggressive fluid hydration is contraindicated. Judicious fluid use with frequent reevaluation is recommended.

- Lab work, such as white blood cell (WBC) count, liver function tests, or renal function, are not typically available in the field, but if labs are available from a skilled nursing facility or hospital, these lab results can be used in decision-making.

- Contraindications for *Acetaminophen* (Tylenol) include liver problems and allergic history.

- Contraindications for *Ibuprofen* include age less than 6 months, kidney problems, or allergic history.

Spinal Immobilization - Indications

Medical Care

MANAGEMENT

Determining the need for spinal immobilization requires a careful assessment of the patient's:

- **Mechanism of injury**
- **Mental status and ability to recognize the presence of spinal injury symptoms**
- **Physical complaints and overall condition**

- Spinal immobilization should always be applied when any concern exists to the possibility of spinal trauma
- Document symptoms such as spinal tenderness, neurological deficits or complaints, paralysis, weakness, or anatomical deformities
- **"Clearing" the spine shall not take place in the pre-hospital setting**
- 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 with Concerning Mechanism of Injury

Concerning mechanism of injury defined as:

- 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

Immobilize if <u>any</u> of the following exist:

- **Altered level of consciousness or inability to communicate:**
  - Abnormal GCS
  - Evidence of significant intoxication
  - Dementia
  - Speech or hearing impairment
  - Age (young children)
  - Language barrier
- **Complaints suggestive of spinal injury:**
  - Spinal pain or tenderness, including paraspinal musculature
  - Neurologic deficit or complaint, including paresthesia, paralysis, or weakness
  - Anatomical deformity of the spine
- **Distracting Injuries:**
  - Long bone fractures
  - Joint dislocations
  - Abdominal or thoracic pain, or obvious visceral injury
  - Large lacerations, degloving injuries, or crush injuries
  - Serious burns
  - Any injury producing acute functional impairment

Spinal Immobilization - Indications

Medical Care

♦ IF IN DOUBT, IMMOBILIZE ♦

Penetrating Trauma

Immobilize if <u>any</u> of the following exist:

- **Altered level of consciousness**
- **Any 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 or tingling in extremities

* Examples are numbness, focal weakness, focal sensory deficit, paresthesia. Identifying the presence of neurological signs and symptoms requires careful assessment and history taking.

♦ IF IN DOUBT, IMMOBILIZE ♦

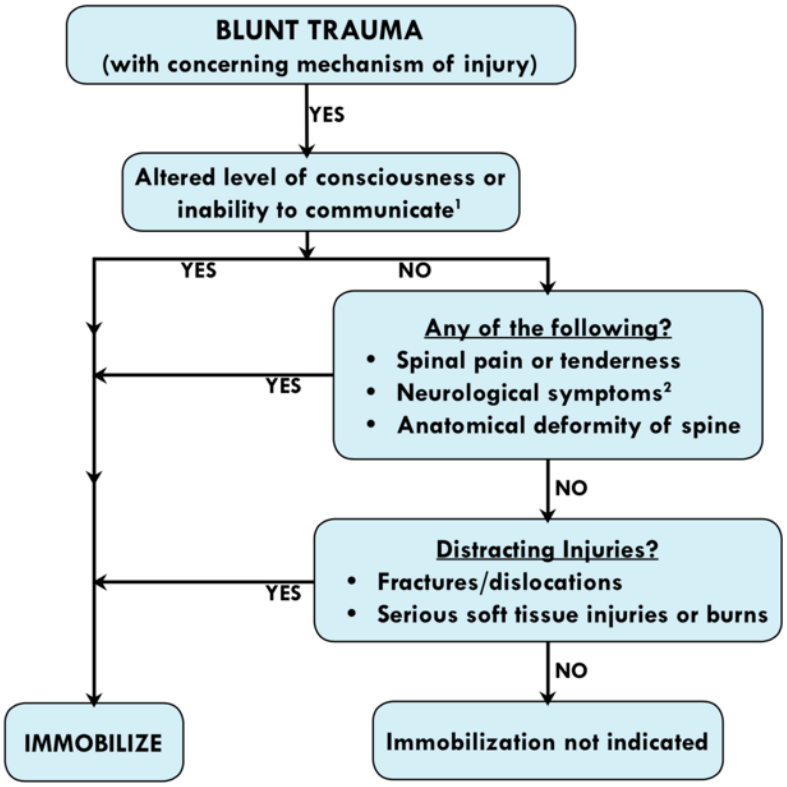
Other Situations

- Spinal precautions can be maintained by application of a cervical collar and securing patient firmly to the stretcher *without* a long backboard if **<u>all 4</u>** of these criteria are met:
  - Patient is ambulatory at the scene
  - Patient does not demonstrate an altered level of consciousness or inability to communicate
  - Patient does not have complaints suggestive of spinal injury
  - Patient does not have distracting injuries

- Immobilize all patients with the following conditions:
  - High voltage electrical injuries (> 1000 volts)
  - Shallow water drowning or diving injuries

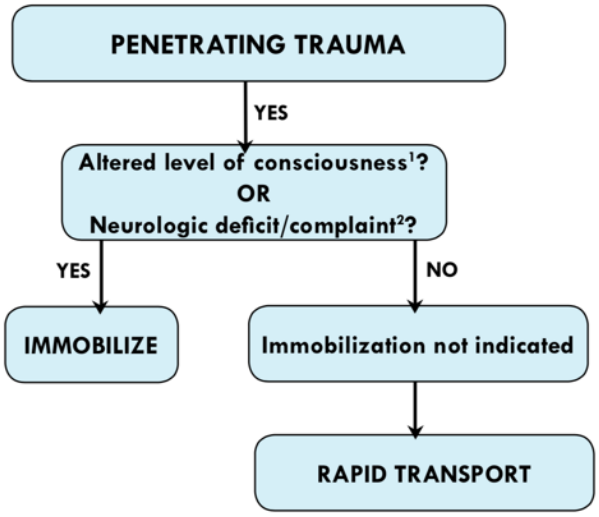
- If spinal immobilization is indicated but refused by the patient:
  - Advise the patient of the indication for immobilization, and the risks of refusing the intervention
  - If the patient allows, apply the cervical collar even if backboard is refused
  - Maintain spinal alignment as best as can be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

- If spinal immobilization is indicated but the patient cannot tolerate supine position:
  - 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



[1] Includes significant intoxication, dementia, speech or hearing impairment, age (young children), language barrier

[2] Examples are numbness, focal weakness, focal sensory deficit, paresthesia



[1] Includes unconsciousness, significant intoxication, dementia, etc.

[2] Examples are numbness, focal weakness, focal sensory deficit, paresthesia

Syncope

Medical Care

MANAGEMENT

Basic Life Support

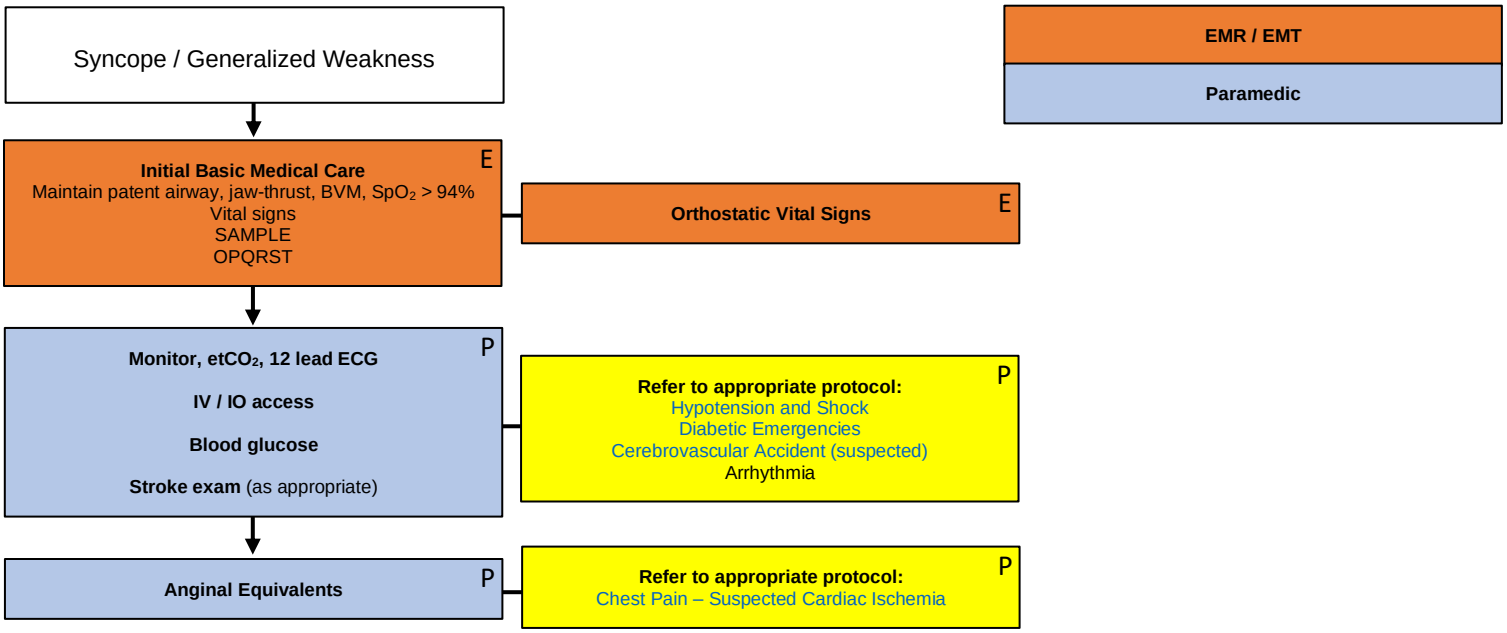
- Full set of vital signs
- Blood glucose measurement
- Supplemental oxygen to maintain SpO_2 > 94%

Advanced Life Support

- Full ALS Assessment and Treatment
- Obtain 12 lead ECG
  - If ECG rhythm is bradycardia, heart block, or dysrhythmia, see specific protocol
- Check blood glucose level
  - If < 70 mg/dL, treat per "Altered Mental Status" and "Diabetic Emergencies" Protocols
- Perform a stroke / neurological exam
  - If Altered Mental Status persists, or if Acute Stroke suspected, refer to appropriate protocol
- Assess for signs and symptoms of trauma.
  - If present, refer to "Trauma" Protocol.
  - Maintain spinal immobilization precautions if findings are suggestive of potential spinal injury.
- Consider cardiac, diabetic, stroke, seizure, dysrhythmia etiologies:
  - Refer to "Chest Pain – Suspected Cardiac Ischemia", "Hypotension and Shock", "Diabetic Emergencies", "Cerebrovascular Accident (suspected)", "Seizure", and/or dysrhythmia protocols as appropriate.
- For hypotension (systolic BP < 90 mmHg) not improved by fluid boluses, or when fluid boluses are contraindicated:
  - *Norepinephrine* 1 – 30 mcg/min infusion, titrate to maintain systolic BP > 90 mmHg
  - *Epinephrine* 2 – 10 mcg/min infusion, titrate to maintain systolic BP > 90 mmHg
  - *Dopamine* 5 – 20 mcg/kg/min infusion, titrate to maintain systolic BP > 90 mmHg
  - Refer to "Hypotension and Shock" Protocol
- These patients should be transported
- Consider performing orthostatic vital signs on patients in non-trauma situations of suspected blood or fluid loss.
  - Positive orthostatic changes:
    - Decrease in systolic BP by 20 mmHg, or
    - Increase in pulse rate by 20 beats/minute

Syncope

Medical Care



Syncope

Medical Care

History	Signs and Symptoms	Differential:
• Past medical history of cardiac, seizure, stroke • **More than 25% of geriatric syncope is cardiac dysrhythmia based** • Occult blood loss (i.e. dark stool from GI bleeding) • Females: LMP, vaginal bleeding • Fluid loss: vomiting, diarrhea • Medications	• Loss of consciousness with recovery • Lightheadedness, dizziness • Palpitations, slow or rapid pulse • Irregular pulse • Decreased blood pressure	• Stroke • Hypoglycemia • Seizure • Hypotension / Shock • Toxicologic • Medication effect • Vasovagal • Orthostatic hypotension • Cardiac syncope • Psychiatric

PEARLS

- Syncope or pre-syncope can be caused by a simple vasovagal response or something more serious (e.g., cardiac or neurological) event.
- Typically, syncope involves **cardiac** dysfunction, **vascular** dysfunction, or **cerebral** dysfunction.
- Causes of syncope include myocardial infarction, heart failure, dysrhythmia, hypoglycemia, anemia, GI bleed, hypovolemia, dehydration, intracranial hemorrhage (e.g., subarachnoid hemorrhage), aortic dissection, pulmonary embolism, intraabdominal hemorrhage (e.g., ruptured ectopic pregnancy), seizure, vasovagal, and orthostatic hypotension.
- More than 25% of geriatric syncope is cardiac dysrhythmia based.

Adult GCS					
Motor Response		**Verbal Response**		**Eye Opening**	
Obeys Commands	6	Oriented	5	Spontaneous	4
Localizes	5	Confused	4	To voice	3
Withdrawal	4	Inappropriate	3	To pain	2
Flexion	3	Incomprehensible	2	None	1
Extension	2	None	1		
None	1				

Section 4. Pediatric Care Protocols

Abdominal Pain / Nausea / Vomiting – Pediatric

Pediatric Care

MANAGEMENT

Basic Life Support

- History – OPQRST, SAMPLE
  - Ask about possible toxic ingestions
- Vitals – before and after interventions – BP, HR, RR, SpO_2, BGL, Temperature
- Cardiac monitoring
- Nothing by mouth. Provide emesis bag or basin to patient (if needed).

Advanced Life Support

- Full Pediatric ALS Assessment and Treatment
- Airway management – monitor airway for emesis. Ensure they are able to protect airway.
- Vascular Access
- For severe pain:
  - *Fentanyl* 1 mcg/kg (max individual dose: 50 mcg) IV/IO/IM. May repeat after 10 minutes PRN pain (Max total dose: 100 mcg)
- For nausea and vomiting:
  - *Ondansetron* (Zofran) 2 mg (8 – 15 kg) or 4 mg (> 15 kg) SL/IV/IO
    - Break 4 mg tablet in half if 2 mg tablet is required
    - Contraindicated < 6 months of age
- If evidence of dehydration:
  - 0.9% NS at 20 cc/kg IV bolus

Airway Emergencies – Pediatric Dyspnea

Pediatric Care

MANAGEMENT

Basic Life Support

- Allow position of greatest comfort (usually sitting up / head of bed elevated)
- Suction oral secretions (if needed)
- Obtain vital signs – before and after interventions – Temperature, HR, RR, BP, SpO_2
- Supplemental 100% oxygen
- If foreign body obstruction is suspected, refer to foreign body protocol
- For inadequate breathing, support ventilation with bag-valve-mask (BVM)

Advanced Life Support

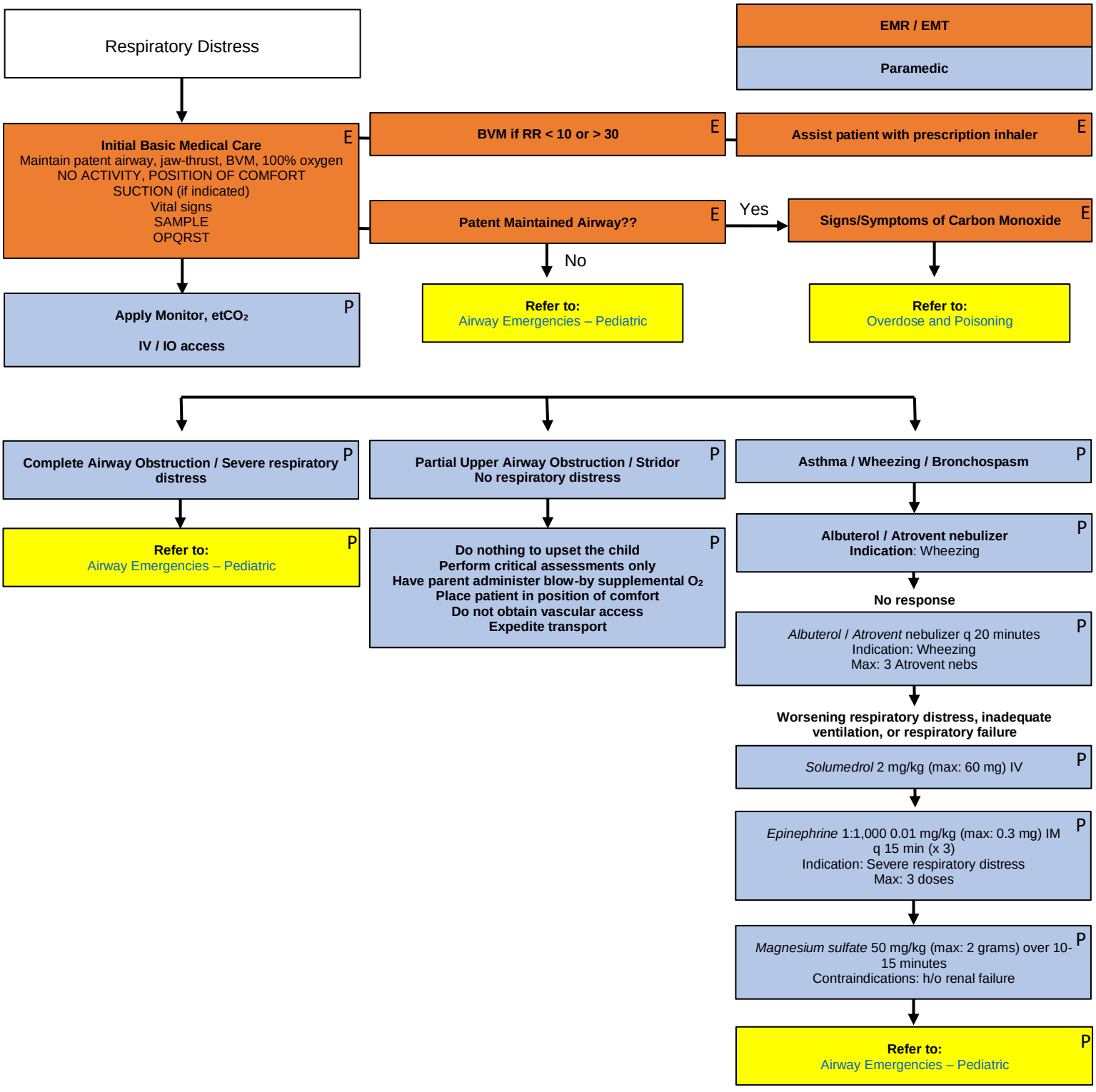
- Full Pediatric ALS Assessment and Treatment
- Apply cardiac monitor, pulse oximetry, end-tidal waveform capnography. If possible, apply capnography before treatment, and record strips as treatment progresses.
- Do not treat solely on waveform findings.
- For bronchospasm:
    - *Albuterol* (Proventil) 2.5 mg / 3 mL and *Ipratropium Bromide* 0.02% (Atrovent) 0.5 mg / 2.5 mL via nebulizer
        - Repeat *Albuterol* (Proventil) every 20 minutes if wheezing persists
        - Repeat *Ipratropium Bromide* (Atrovent) every 20 minutes if wheezing persists, for a max of 3.
    - If patient shows signs of worsening respiratory distress, inadequate ventilation, or respiratory failure in the setting of bronchospasm or a history of asthma:
        - *Epinephrine 1:1,000* at 0.01 mg/kg (max: 0.3 mg) IM
            - May repeat *Epinephrine* every 15 minutes X 2 additional doses (max total dose: 3) if severe symptoms persist
            - May administer at same time nebulizer is being administered
        - *Methylprednisolone* (Solumedrol) 2 mg/kg IV or IM (max individual dose: 60 mg)
        - Obtain IV / IO access
        - *Magnesium Sulfate* 50 mg/kg (max: 2 grams) IV over 10-15 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. Children will protect their airway by their body position.
    - Do not obtain vascular access, unless absolutely necessary
    - Expedite transport
- If complete airway obstruction, or severe respiratory distress, failure, or arrest:
    - Advanced airway/ventilatory management as needed
    - Refer to "Airway Emergencies – Pediatric" Protocol

Drowning

- Spinal immobilization if pool-related event or circumstances uncertain
- Protect from heat loss
- Patients may develop delayed onset respiratory symptoms
    - Consider CPAP/BiPap for patients with significant dyspnea or hypoxia if size allows
- Refer to appropriate protocol if cardiac arrest present

Airway Emergencies – Pediatric Dyspnea

Pediatric Care



Airway Emergencies – Pediatric Dyspnea

Pediatric Care

History	Signs and Symptoms	Differential:
• Asthma, bronchitis, bronchiolitis • Home treatment (oxygen, nebulizers) • Medications (steroids, inhalers) • Toxic exposure, smoke inhalation	• Shortness of breath • Decreased ability to speak • Increased respiratory rate and effort • Wheezing, rhonchi, rales, stridor • Accessory muscle use • Retractions • Fever, cough • Tachycardia	• Asthma • Anaphylaxis • Aspiration • Pleural effusion • Pneumonia • Pneumothorax • Cardiac (CHF) • Pericardial tamponade • Hyperventilation • Inhaled toxin - carbon monoxide

PEARLS

- Determine **severity** of dyspnea (moderate vs. severe shortness of breath):
  - **Moderate**: inability to speak full sentences, increased work of breathing, retractions
  - **Severe**: confusion, cyanosis, severe agitation, inadequate respiratory effort

- **Asthma / Bronchospasm** – A patient with signs/symptoms of acute respiratory distress from *bronchospasm* or *obstructive* airway disease. Additional signs and symptoms may include:
  - Wheezing. Wheezing may be *absent* if patient is unable to move adequate air to generate wheezing (silent chest), which is indicative of *respiratory arrest!* Another way of stating this is – **A patient that is not wheezing does not mean everything is okay; that patient may not be able to move air!** The patient may require epinephrine or assisted ventilations.
  - May have signs of respiratory infection (fever, nasal congestion, cough, sore throat) or acute onset after inhaling irritant.
  - Aggressive use of bronchodilators is the most important therapy for asthma exacerbation (to reverse bronchospasm)
  - Although sometimes needed, *intubation may further the airway obstruction* in a severe asthma exacerbation (as air may not be allowed to escape), and this may worsen some cases. **Intubated patients with an acute asthma exacerbation are at high risk for pneumothorax or air trapping and need very close monitoring**.

- If patients are dyspneic due to an inhaled agent, consult **Poison Control** (1-800-222-1222). Refer to "Overdose and Poisoning".

- **Bronchiolitis** is a viral infection that typically affects infants, resulting in wheezing, but does not usually respond to Albuterol.

- **Croup** typically affects children < 2 years old. + viral infection, +/- fever, gradual onset, - drooling. Characteristic seal-like barking cough. Administer Epinephrine nebulizer treatment.

- **Epiglottitis** typically affects children > 2 years old. + bacterial infection, + fever, rapid onset, + drooling, possible stridor, patient will want to sit upright to keep airway open. Manipulation of the airway may worsen the condition. May consider Epinephrine nebulizer; however, hold treatment near face (do not place mask on face) to prevent agitating patient which could lead to worsened airway edema.

Airway Emergencies – Pediatric Respiratory Failure

Pediatric Care

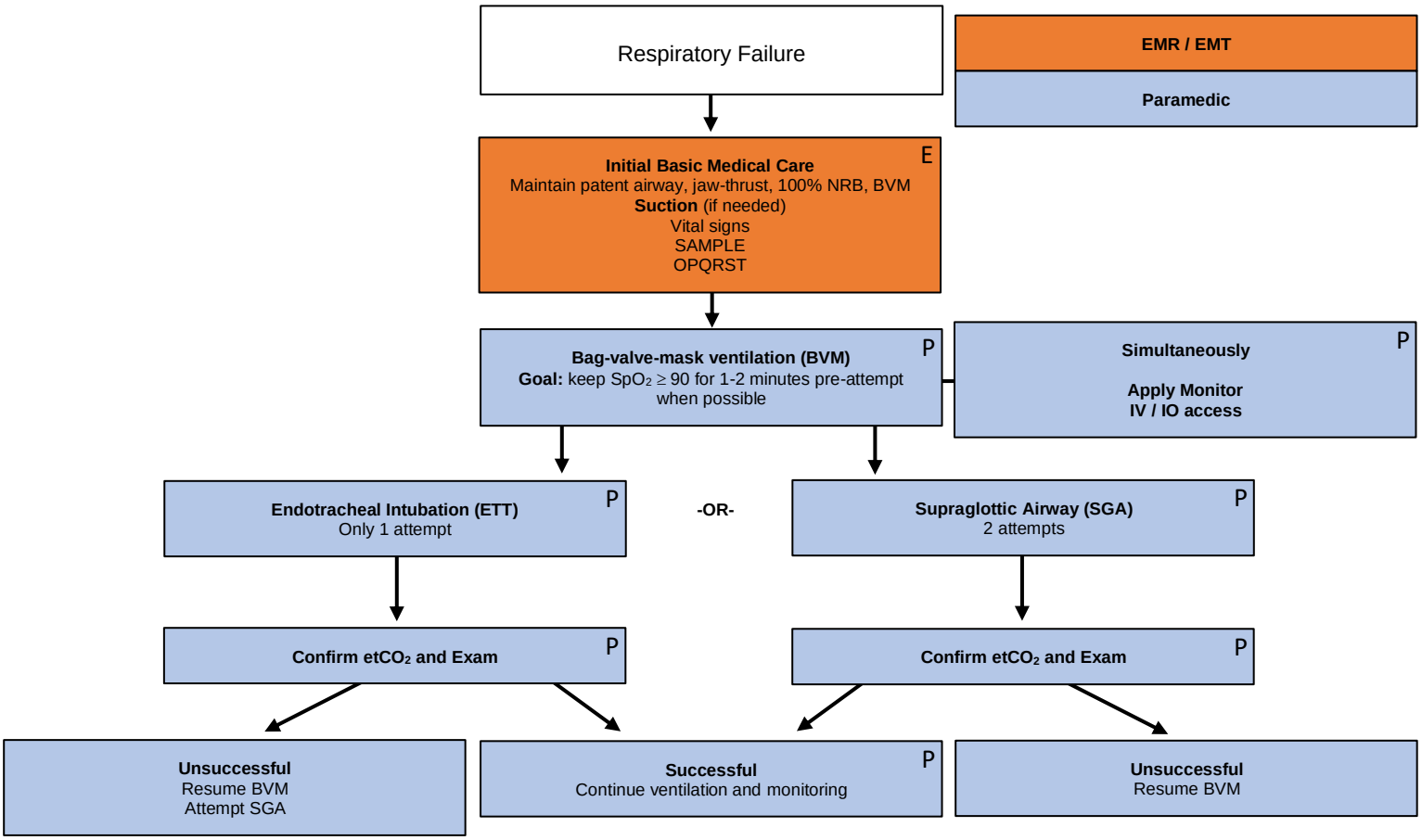
MANAGEMENT

Basic Life Support

- If suspicion of trauma, maintain C-spine immobilization
- Suction all debris, secretions from airway (if needed)
- Supplemental 100% oxygen, then bag-valve-mask ventilate if indicated
  - Use only sufficient volume and force to just make chest rise visibly
  - Ventilate at a rate of 12 – 20 breaths/minute, using the higher rate for younger ages
- Obtain full set of vital signs including SpO_2

Advanced Life Support

- Have assistant apply cardiac monitor as soon as possible
- Address cardiac rhythm abnormalities per appropriate protocol
- Monitor $etCO_2$ and SpO_2 continuously
- BVM ventilate at least 2 minutes with 100% oxygen to achieve SpO_2 > 90%
- Follow sequence listed below (use weight/length-based tape to select appropriate equipment)



- At every step of airway algorithm, effective **bag-valve-mask ventilation is an acceptable** level of airway management
- Components of effective ventilation include oxygenation, chest rise and fall, adequate lung sounds, and the presence of an alveolar waveform on capnography
- Monitor $etCO_2$, SpO_2, and assess for effective ventilation continuously

Confirmation of Placement and Effectiveness of Ventilation (ETT or SGA)

Capnography / $etCO_2$ monitoring:

- Digital waveform capnography is the **standard** for $etCO_2$ monitoring.
- Continuous $etCO_2$ monitoring is a ***mandatory*** component of invasive airway management.
- Immediately after placing an ETT or SGA, capnography shall be applied to confirm proper placement.
    - Proper placement is indicated by the presence of a continuous alveolar waveform on capnography.
    - If an alveolar waveform is not initially present, or disappears after 3-5 breaths (i.e., flat-line), remove the ETT or SGA and proceed to the next step in the algorithm (previous page)
- Patients should not be switched from digital capnography to colorimetric device for monitoring $etCO_2$, unless on-scene equipment failure:
    - If capnography is not available due to serious on-scene equipment failure, apply a colorimetric $etCO_2$ detector capable of continuous $etCO_2$ monitoring (much less reliable)
- If continuous expired $etCO_2$ cannot be detected by either of the above methods (waveform or colorimetric), the invasive airway device **must** be removed, and the airway managed noninvasively (BVM)

Additional Measures:

- Assess epigastric sounds, breath sounds, and chest rise and fall
- Record tube depth and secure in place using a commercial tube holder
- Utilize head restraint devices (e.g., “head-blocks”) or rigid cervical collar and long spine board immobilization as needed to help secure airway device in place

Airway Emergencies – Pediatric Foreign Body

Pediatric Care

MANAGEMENT

Basic Life Support

- Perform obstructed airway procedures per BLS standard
    - Patients with partial obstruction (can speak, cough forcefully, cry, or breathe) should NOT undergo advanced maneuvers below
    - For conscious, choking CHILDREN (cannot cough / cry / breathe), repeat sets of **5 back blows** and **5 abdominal thrusts** until the object is forced out, patient can cry / cough / breathe, or patient becomes unconscious
    - For conscious, choking INFANTS (cannot cough / cry / breathe), repeat sets of **5 back blows** and **5 chest thrusts** until the object is forced out, patient can cry / cough / breathe, or patient becomes unconscious
    - For **unconscious**, choking CHILDREN or INFANTS, start **CPR**, open airway using a head tilt/chin lift (if no trauma), look for foreign body, remove if seen
- Administer **100% oxygen** via NRB for any patient with respiratory distress
- Bag-valve-mask ventilate if indicated

Advanced Life Support

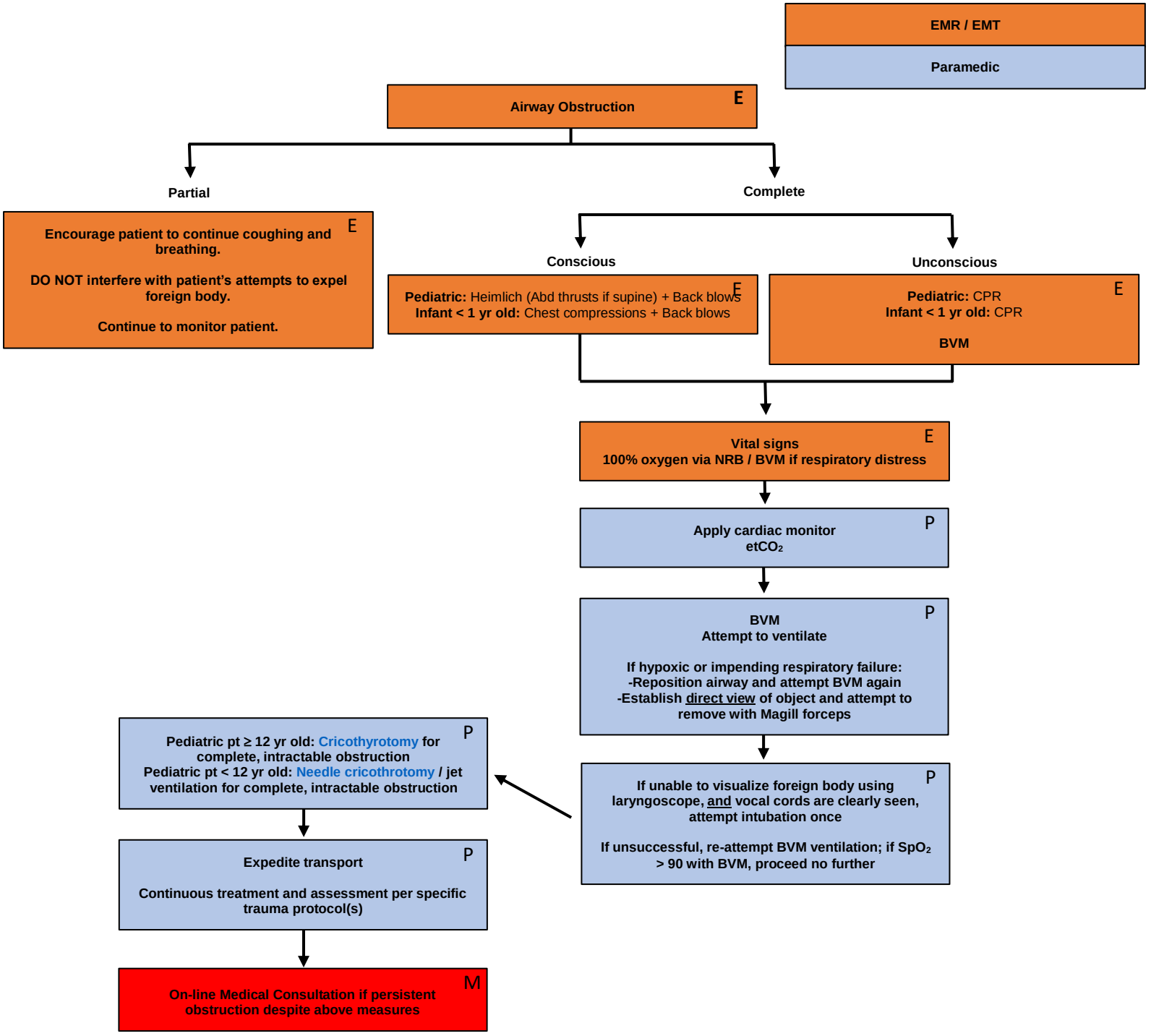
- Repeat abdominal/chest thrusts and back blows until foreign object is expelled and airway is cleared or patient becomes unconscious.
- If ventilation is unsuccessful (SpO_2 cannot be kept > 90) or signs of impending respiratory failure, perform the following in order:
    - Reposition airway and attempt bag-valve-mask-assisted ventilation again
    - If unsuccessful, establish direct view of object 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 SpO_2 > 90 with BVM, proceed no further and expedite transport
- If patient cannot be ventilated/oxygenated with the above measures, perform needle cricothyrotomy and needle jet insufflation as a last resort
- If airway is cleared, support ventilations as needed with 100% oxygen.
- Expedite transport to nearest ED
- Monitor for signs of hypoxia, cardiac dysrhythmias, and waveform $etCO_2$ after airway is secured.
- All patients should be encouraged to seek medical attention.

Airway Emergencies – Pediatric Foreign Body

Pediatric Care

TREATMENT PRIORITIES

1. Remove obstruction
2. Oxygenation / Ventilation support



Airway Emergencies – Pediatric Foreign Body

Pediatric Care

History	Signs and Symptoms	Differential:
• Partial obstruction • Complete obstruction • Tracheal stenosis • Foreign body	• Coughing • Cyanosis • Choking sign (hands around neck) • Drooling • Inability to speak or cough • Apparent distress • Anxiety/Stress	• Anaphylaxis • Epiglottitis • Foreign body • Fractured larynx • Peritonsillar abscess

Allergic Reactions - Pediatric

Pediatric Care

MANAGEMENT

Basic Life Support

- Maintain adequate airway. Bag-Valve-Mask ventilate if indicated.
- Supplemental oxygen to maintain SpO_2 > 94%. If oxygen is needed, notify dispatch / Levy DPS the patient is **critical**.
- Obtain full set of vital signs – before and after interventions.
- If signs of **anaphylaxis** (oral swelling, stridor, wheezing, respiratory distress, hypoxia, full-body hives, or hypotension [systolic BP < 100 mmHg]), notify dispatch / Levy DPS the patient is **critical**.
    - The first responder may assist the patient in self-administration of the patient's own previously prescribed *epinephrine* (via auto-injector)
- Nothing by mouth

Advanced Life Support

- Maintain adequate airway. Proceed to "Airway Emergencies – Pediatric Respiratory Failure" Protocol and intubation, if necessary.
- Supplemental oxygen to maintain SpO_2 > 94%.
- Establish IV / IO access. Maintain systolic BP > 90 mmHg. If hypotensive, follow "Severe Reaction" below.
- If Moderate or Severe symptoms, perform Full Pediatric ALS Assessment and Treatment

Mild reaction (Isolated itching, hives, local swelling)

- *Diphenhydramine* (Benadryl) 1 mg/kg IV (Max: 50 mg)
    - May be administered IM if no IV access available
- Consider *Methylprednisolone* (Solumedrol) 2 mg/kg IV or IM (Max: 60 mg)

Moderate reaction (Mild Dyspnea, Wheezing, Chest tightness)

- *Albuterol* (Proventil) 2.5 mg / 3 mL and *Ipratropium Bromide* 0.02% (Atrovent) 0.5 mg / 2.5 mL via nebulizer
    - Repeat *Albuterol* (Proventil) every 20 minutes if wheezing persists
    - Repeat *Ipratropium Bromide* (Atrovent) every 20 minutes if wheezing persists, for a max of 3.
- *Diphenhydramine* (Benadryl) 1 mg/kg IV (Max: 50 mg)
    - May be administered IM if no IV access available
- *Methylprednisolone* (Solumedrol) 2 mg/kg IV or IM (Max: 60 mg)

Severe reaction (anaphylaxis, systolic BP < 90 mmHg, stridor, severe respiratory distress)

- **Defined as a reaction that causes any oral edema (angioedema) or that affects 2 or more body systems**
- **i.e. urticaria + wheezing = anaphylaxis; urticaria + vomiting = anaphylaxis; angioedema = anaphylaxis**
- **These situations are all examples of anaphylaxis and should be given IM epinephrine before the initiation of an IV or other therapies**
- Evaluate for respiratory distress or compromise. Intubate if necessary
- *Epinephrine 1:1,000* 0.01 mg/kg IM (Max: 0.3 mg)
    - Massage injection site vigorously for 30-60 seconds

  - Repeat *Epinephrine* **ONCE** if signs/symptoms of severe reaction or shock persist after initial dose
  - If persistent signs/symptoms of severe reaction or shock, contact OLMD for additional orders
- *Albuterol* (Proventil) 2.5 mg / 3 mL and *Ipratropium Bromide* 0.02% (Atrovent) 0.5 mg / 2.5 mL via nebulizer
  - Repeat *Albuterol* (Proventil) every 20 minutes if wheezing persists
  - Repeat *Ipratropium Bromide* (Atrovent) every 20 minutes if wheezing persists, for a max of 3.
- *Diphenhydramine* (Benadryl) 1 mg/kg IV (Max: 50 mg)
  - May be administered IM if no IV access available
- *Methylprednisolone* (Solumedrol) 2 mg/kg IV or IM (Max: 60 mg)
- 0.9% NS at 20 cc/kg IV bolus

Allergic Reactions - Pediatric

Pediatric Care

Allergic Reaction / Anaphylaxis

EMR / EMT

Paramedic

Initial Basic Medical Care E
Maintain patent airway, jaw-thrust, BVM, SpO_2 > 94%
Vital signs
SAMPLE
OPQRST

Assist self-administration of: E

***Epinephrine* (auto-injector) IM** (if signs of anaphylaxis)

Apply Monitor P

$etCO_2$

IV / IO access

Stable/Mild P
Isolated itching, hives, localized swelling

Diphenhydramine 1 mg/kg IV / IM
Max: 50 mg P

Consider *Methylprednisolone* 2 mg/kg IV / IM
Max: 60 mg P

Moderate P
SOB
Wheezing
Chest tightness

Albuterol / *Atrovent* nebulizer q 20 minutes P
Indication: Wheezing
Max: 3 Atrovent nebs

Diphenhydramine 1 mg/kg IV / IM P
Max: 50 mg

Methylprednisolone 2 mg/kg IV / IM P
Max: 60 mg

Severe P
Anaphylaxis
Hypotension (systolic BP < 90 mm Hg)
Stridor
Respiratory distress
Angioedema / Tongue edema
2 organ system involvement

***Epinephrine* 1:1000 0.01 mg/kg IM** P
Max: 0.3 mg
May repeat once

Intubate (if necessary) P

Albuterol / *Atrovent* nebulizer q 20 minutes
Indication: Wheezing
Max: 3 Atrovent nebs

Diphenhydramine 1 mg/kg IV / IM
Max: 50 mg

Methylprednisolone 2 mg/kg IV / IM
Max: 60 mg

0.9% NaCl IV bolus (if hypotensive)

Refractory Hypotension M
On-line Medical Consultation

Refer to: P
Airway Emergencies – Pediatric

Allergic Reactions - Pediatric

Pediatric Care

History	Signs and Symptoms	Differential:
• Onset and location • Insect sting or bite • Food allergy/exposure • Medication allergy/exposure • New clothing, soap, detergent • History of reactions • Past medical history • Medication history	• Itching or hives • Coughing/wheezing • Respiratory distress • Chest or throat constriction • Difficulty swallowing • Hypotension or shock • Edema	• Urticaria (rash only) • Anaphylaxis (systemic effects) • Shock (vascular effect) • Angioedema (drug induced) • Aspiration/airway obstruction • Vasovagal event • Asthma

PEARLS

- Symptoms range from *urticaria*, *flushing*, *itching*, and *facial edema* to *respiratory distress, laryngoedema* (manifested as laryngospasm or stridor), *hypotension,* and *shock*
- Within the past several hours, the patient may have been exposed to a precipitating medication, insect bite, allergen, or food.
- Attempt to identify the cause of allergic reaction (consider medications and latex) and prevent or eliminate further exposure.
- **The shorter the onset from contact to symptoms, the more severe the reaction.**
- **Be prepared for recurrence** of allergic signs and symptoms despite initial interventions.
- Early, rather than late, airway intervention may be required if swelling progresses rapidly.
- **Danger signs:** rapid progression of symptoms, respiratory distress (stridor, wheezing, dyspnea, increased work of breathing, persistent cough, cyanosis), abdominal pain, hypotension, chest pain, dysrhythmias
- Antihistamines and corticosteroids are *second*-line agents for the treatment of anaphylactic shock
- Antihistamines should be administered after the airway is secured and hypotension is resolved (ABCs are priority).

Altered Mental Status - Pediatric

Pediatric Care

MANAGEMENT

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

Basic Life Support

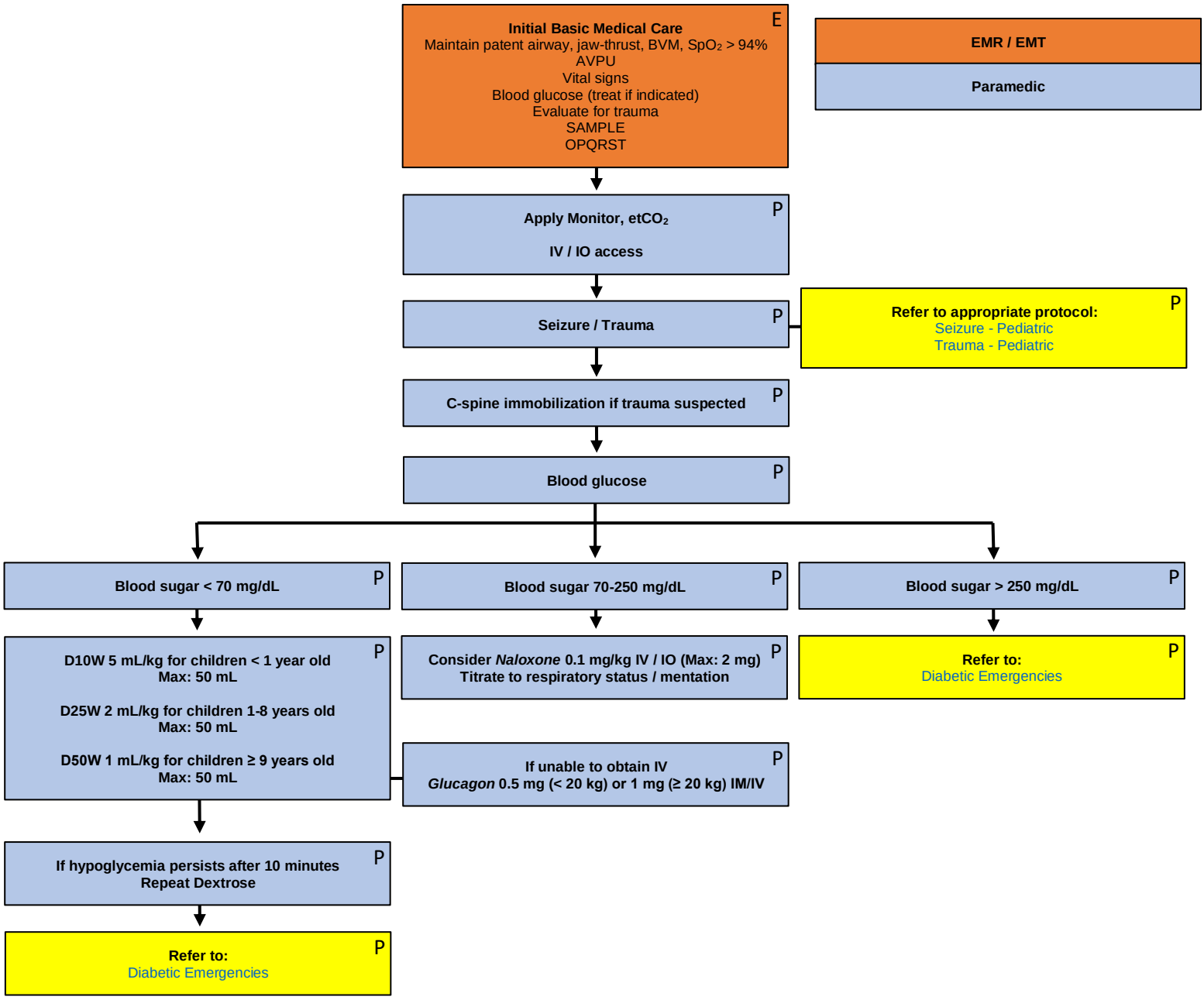
- Assess level of responsiveness according to **AVPU**. Obtain **SAMPLE** history.
- Obtain full set of **vital signs** and evaluate for **hypoglycemia** (treat if indicated)
- Evaluate for **trauma** (cervical spine immobilization as indicated).
- Maintain SpO_2 > 94%. If oxygen is needed, notify dispatch / Levy DPS the patient is **critical**.

Advanced Life Support

- Full Pediatric ALS Assessment and Treatment
- Maintain adequate airway. Refer to "Airway Emergencies – Pediatric" Protocol.
- Establish IV / IO access.
- Determine blood glucose and treat glucose < 70 mg/dL
    - *D10W* at 5 mL/kg for children < 1 year old (Max: 50 mL)
        - Waste 40 mL of D50 and draw up 40 mL of NS.
    - *D25W* at 2 mL/kg for children 1-8 years old (Max: 50 mL)
        - Waste 25 mL of D50 and draw up 25 mL of NS
    - *D50W* at 1 mL/kg for children ≥ 9 years old (Max: 50 mL)
    - If no IV available:
        - Glucose paste (if > 2 years old) or other oral glucose containing agent (e.g., orange juice) if patient is alert enough to self-administer oral agent.
        - Do not give oral glucose if patient cannot protect own airway.
        - If unable to take oral glucose, administer *Glucagon* 0.5 mg (< 20 kg) or 1 mg (≥ 20 kg) IM/IV
    - Recheck blood glucose after 10 minutes. If hypoglycemia persists:
        - Repeat blood glucose check with a different glucometer
        - Repeat *Dextrose* (as above) once if blood glucose < 70 mg/dL after 10 minutes
        - Patient must be transported
- If Opioid overdose suspected (significantly altered mental status or respiratory depression):
    - *Naloxone* (Narcan) 0.1 mg/kg IV /IO (Max: 2 mg)
        - If IV / IO unavailable, *Naloxone* (Narcan) can be given IM or via mucosal atomizer device
    - If patient returns to baseline after *Naloxone*, further boluses may be necessary. Re-dose as needed to clinical effect (repeat doses every 3 minutes).
- If Seizure suspected, see "Seizure – Pediatric" Protocol
- If Head Injury suspected, see "Trauma – Pediatric" Protocol. Perform spinal immobilization.

Altered Mental Status - Pediatric

Pediatric Care



Altered Mental Status - Pediatric

Pediatric Care

History	Signs and Symptoms	Differential:
• Onset and Duration • Known diabetic/medic alert tag • Report of toxic ingestion • Medical history • Medications / Allergies • Head trauma • Change in condition • Seizures • Allergies	• Headache • Dizziness • Syncope • Weakness • Speech difficulties • Visual disturbances • Decreased mental status • Change in baseline behavior • Bizarre behavior	• Head trauma • CNS (tumor, seizure, infection) • Infection/sepsis • Thyroid • Shock • Diabetes • Toxicologic • Acidosis, alkalosis • Environmental (exposure) • Pulmonary (hypoxia) • Electrolyte abnormalities • Psychiatric

PEARLS

- Be aware of altered mental status as a presenting sign of an **environmental toxin** or **HazMat** exposure. **Protect personal safety at all times!**
- Toxic overdoses such as narcotics can precipitate hypoglycemia in children.
- Many of the conditions causing altered mental status have potential to cause significant morbidity and mortality. It is essential that care be started in the field *prior* to diagnosis.
- **Causes of acute altered mental status** ("DON'T") include **d**extrose (hypoglycemia), **o**xygen, **n**arcan, **t**rauma
- **Causes of altered mental status** ("AEIOUTIPS") include **a**lcohol, **e**ncephalopathies (hepatic or hypertensive), **i**nsulin (DKA or hypoglycemia), **o**piates, **u**remia (renal failure), **t**rauma, **t**oxins, **t**umors, **t**hyrotoxicosis, **i**nfections, **p**sychiatric, **s**eizures, **s**epsis, and **s**troke.
- It is safer to assume **hypoglycemia** than hyperglycemia if doubt exists.
- Do not give oral glucose if the patient cannot protect his/her own airway
- If a patient demonstrates restlessness, agitation, confusion, and/or potentially violent behavior (regardless of underlying diagnosis), the clinician shall assess the patient and take appropriate measures to medicate and restrain the patient prior to and during transport.
  - **Remember that agitation may signal a physiologic deterioration of the patient and accompany hypoxia, hypoglycemia, cerebral edema, sepsis, etc.**
  - **Safety for both the EMS crew and the patient is paramount. Take no action that may endanger EMS personnel or the patient.**
  - Consider restraints if necessary for patient's and/or personnel's safety. Refer to "Behavioral Emergencies" Protocol.
- Consider opiate overdose in patients with GCS < 12, respiratory depression (RR < 12), hemodynamic instability, pinpoint pupils, history of opiate use/abuse, etc.

Brief Resolved Unexplained Event (BRUE) - Pediatric

Pediatric Care

MANAGEMENT

A Brief Resolved Unexplained Event (BRUE), previously known as Apparent Life Threatening Event (ALTE), sometimes referred to as a "near-miss" SIDS, is any episode in which an infant or young child has an appearance that concerns observers that the child may be dying or at risk of dying, and involves some combination of the following:

- Apnea
- Color change (cyanosis, pallor, erythema, plethora)
- Marked change in muscle tone (limpness)
- Choking or gagging

History of a BRUE may represent serious illness, even if the infant appears entirely well by the time he or she is evaluated. The apparent well-being should not be considered evidence that a potentially life-threatening event with successful resuscitation did not occur if the clinical history indicates otherwise.

Basic Life Support

- 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
    - Consider non-accidental trauma
- Perform a thorough physical assessment that includes the general appearance, skin color, level of interaction with environment, and evidence of trauma
- Check blood glucose in all patients

Advanced Life Support

- IV access, if applicable
- Cardiac monitor
- If seizure, refer to "Seizure – Pediatric" Protocol
- If hypoglycemia, refer to "Altered Mental Status – Pediatric" Protocol
- Transport to the nearest appropriate receiving facility
- Frequently reassess patients as they remain at risk for apnea, aspiration, seizure, and sepsis
- History of a BRUE may represent serious illness, even if the infant appears entirely well by the time he or she is evaluated.
    - Contact with OLMD is strongly recommended for all patients.
    - Contact with OLMD is required prior to accepting a refusal for patients < 1 year of age

Brief Resolved Unexplained Event (BRUE) - Pediatric

Pediatric Care

PEARLS

- Incidence peaks at 10 – 12 weeks old, and premature infants and children at less than 1 year old are considered high-risk.
- There are many causes of BRUEs, including airway obstruction, cardiac abnormalities, hypoglycemia, sepsis, meningitis, respiratory tract infection, seizure, metabolic syndromes, and trauma (including non-accidental). Patients may have no further symptoms but still remain at high risk for sudden death, including from Sudden Infant Death Syndrome (SIDS). It is thus important to stress the need for full ED evaluation, even in well-appearing children, and be ready to provide supportive care or Pediatric Advanced Life Support (PALS) as needed.

Cardiac Arrest (Non-traumatic) - Pediatric

Pediatric Care

MANAGEMENT

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

Basic Life Support

- 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 < 8 years old, use pediatric AED cables/electrodes (if available)
    - As a last resort in a child < 8 years old in cardiac arrest, apply AED with any available cables/electrodes

Advanced Life Support

- Full Pediatric ALS Assessment and Treatment
- Determine cardiac rhythm and refer to appropriate protocol for further management actions
- Check blood glucose and treat glucose < 70 mg/dL
    - *D10W* at 5 mL/kg for children < 1 year old (Max: 50 mL)
        - Waste 40 mL of D50 and draw up 40 mL of NS.
    - *D25W* at 2 mL/kg for children 1-8 years old (Max: 50 mL)
        - Waste 25 mL of D50 and draw up 25 mL of NS
    - *D50W* at 1 mL/kg for children ≥ 9 years old (Max: 50 mL)

Asystole and Pulseless Electrical Activity

Advanced Life Support

- Follow "Cardiac Arrest (Non-traumatic) – Pediatric" BLS protocol
- Confirm the presence of Asystole in two leads
- Minimize any interruptions in compressions
- Using the most readily available route, administer (during CPR):
    - *Epinephrine 1:10,000* 0.01 mg/kg (Max: 1 mg) IV/IO every 3-5 min during arrest, **OR**
    - If no IV/IO, *Epinephrine 1:1,000* 0.1 mg/kg (Max: 2.5 mg) diluted in 5 mL of NaCl via endotracheal tube; give 5 manual ventilations after drug administered
- Treat any suspected contributing factors:
    - If hypovolemic, administer 0.9% NaCl 20 mL/kg IV/IO bolus, may repeat x 2 (Max total dose: 60 mL/kg)
    - If hypoxic, secure airway and assist ventilation
        - BVM is sufficient to address hypoxia and assist ventilation
    - If hypothermic, rewarm
    - If hyperkalemia suspected (history of renal failure/dialysis):
        - *Calcium chloride (10%)* 20 mg/kg IV (Max individual dose: 1 g)
        - *Sodium Bicarbonate* 1 mEq/kg IV

- If toxin ingestion, see specific toxin section
- Assess for tension pneumothorax:
  - Unilateral decreased or absent lung sounds (may see tracheal deviation away from collapsed lung field)
  - Evidence of hemodynamic compromise
  - If tension pneumothorax suspected due to history or condition, perform pleural decompression at 2nd intercostal space, mid-clavicular line

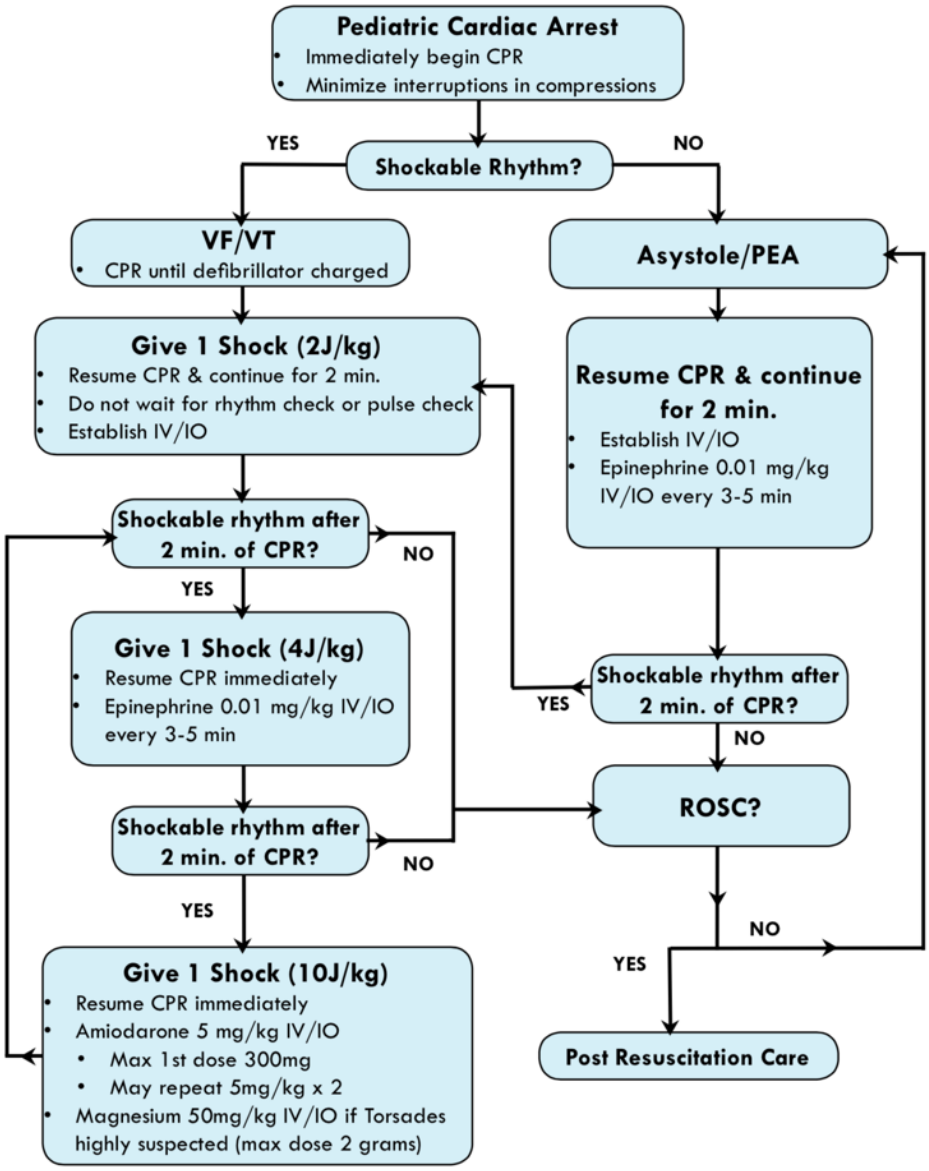
Ventricular Fibrillation or Pulseless Ventricular Tachycardia

Advanced Life Support

- Follow "Cardiac Arrest (Non-traumatic) – Pediatric" BLS protocol
- Confirm the presence of ventricular fibrillation/pulseless ventricular tachycardia
- Defibrillate for VF or pulseless VT:
  - Defibrillate at 2 J/kg (max: 200J)
  - Continue CPR immediately after shock (do not stop to check pulse or rhythm)
  - Call first defibrillation time to dispatch (if not done above)
- Analyze rhythm after 2 minutes of good CPR; If VF/VT persists:
  - Defibrillate at 4 J/kg (max: 360J)
  - Continue CPR immediately after shock (do not stop to check pulse or rhythm)
  - *Epinephrine 1:10,000* 0.01 mg/kg (Max: 1 mg) IV/IO every 3-5 min during arrest, **OR**
  - If no IV/IO, *Epinephrine 1:1,000* 0.1 mg/kg (Max: 2.5 mg) diluted in 5 mL of NaCl via endotracheal tube; give 5 manual ventilations after drug administered
- Analyze rhythm after 2 minutes of good CPR; If VF/VT persists:
  - Defibrillate at 10 J/kg (max: 360 J)
    - All subsequent shocks at 10 J/kg (max: 360 J)
  - Continue CPR immediately after shock (do not stop to check pulse or rhythm)
  - *Amiodarone* 5 mg/kg IV/IO bolus (max individual dose: 300 mg)
    - For persistent VF/VT, repeat *Amiodarone* 5 mg/kg IV/IO bolus on second and third round (max total dose: 15 mg/kg)
- Continue cycle of CPR & Drug → Rhythm Check → CPR → Shock → CPR and Drug → Rhythm Check → CPR → Shock as needed
- *Magnesium Sulfate* 50 mg/kg IV/IO over 1-2 minutes for suspected torsades de pointes

Cardiac Arrest (Non-traumatic) - Pediatric

Pediatric Care



Cardiac Arrhythmia - Pediatric

Pediatric Care

MANAGEMENT

Bradycardia

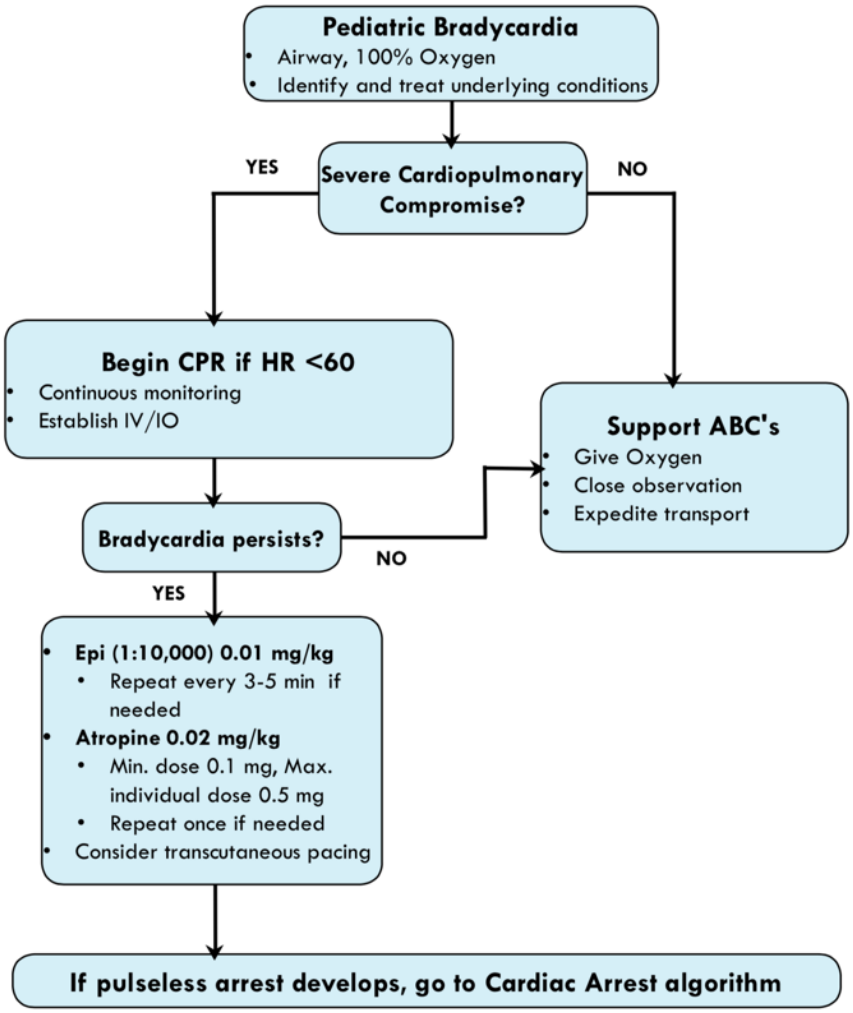
Basic Life Support

- Supplemental 100% oxygen
- Open airway using head tilt-chin lift method
- Assist ventilation as needed using Bag-Valve-Mask
- Look for signs of airway obstruction
    - Absent breath sounds, intercostal retractions, stridor, choking, bradycardia, or cyanosis

Advanced Life Support

- Full Pediatric ALS Assessment and Treatment
- Identify and treat possible causes of bradycardia:
    - If hypoxic: open airway, assist breathing
    - If hypothermic: re-warm
    - If acutely deteriorating head injury: hyperventilate (goal $etCO_2$ of 30-35 mmHg)
    - If heart block or post-heart transplant: apply transcutaneous pacer (see below)
    - If toxin ingestion: see specific toxin
- In an infant (< 1 year), if heart rate remains slower than 60 beats per minute despite oxygenation and ventilation, initiate chest compressions
- If signs of severe cardiopulmonary compromise persist (use first available route):
    - *Epinephrine 1:10,000* 0.01 mg/kg (Max: 1 mg) IV/IO every 3-5 min during arrest, **OR**
    - If no IV/IO, *Epinephrine 1:1,000* 0.1 mg/kg (Max: 2.5 mg) diluted in 5 mL of NaCl via endotracheal tube; give 5 manual ventilations after drug administered
    - Repeat dose every 3-5 minutes until either the bradycardia or severe cardiopulmonary compromise resolves
- If signs of severe cardiopulmonary compromise persist despite Epinephrine:
    - *Atropine* at 0.02 mg/kg via IV/IO/Endotracheal tube
        - Minimum dose is 0.1 mg; Maximum individual dose is 0.5 mg
        - If given via ETT, dilute in 5 mL of NaCl and administer 5 ventilations after drug given
        - May repeat once after 3-5 minutes
- If severe cardiopulmonary compromise persists despite Epinephrine/Atropine, apply transcutaneous pacemaker:
    - If weight is ≥ 15 kilograms, apply adult transcutaneous pacemaker
    - If < 15 kilograms, use pediatric pads (small/medium electrodes) in the standard configuration for adult size pacer pads
    - Use lowest energy setting that achieves ventricular capture (pulse)
- Check blood glucose and treat glucose < 70 mg/dL
    - *D10W* at 5 mL/kg for children < 1 year old (Max: 50 mL)
        - Waste 40 mL of D50 and draw up 40 mL of NS.
    - *D25W* at 2 mL/kg for children 1-8 years old (Max: 50 mL)
        - Waste 25 mL of D50 and draw up 25 mL of NS

- *D50W* at 1 mL/kg for children ≥ 9 years old (Max: 50 mL)



Tachycardia

Basic Life Support

- Supplemental 100% oxygen
- If trauma suspected, stabilize spine

Advanced Life Support

- Full Pediatric ALS Assessment and Treatment
- Check blood glucose and treat glucose < 70 mg/dL
  - *D10W* at 5 mL/kg for children < 1 year old (Max: 50 mL)
    - Waste 40 mL of D50 and draw up 40 mL of NS.
  - *D25W* at 2 mL/kg for children 1-8 years old (Max: 50 mL)
    - Waste 25 mL of D50 and draw up 25 mL of NS
  - *D50W* at 1 mL/kg for children ≥ 9 years old (Max: 50 mL)

Cardiac Arrhythmia - Pediatric

Pediatric Care

Sinus Tachycardia

- Infants: rate usually **< 220/min**
- Children: rate usually **< 180/min**
- Identify and treat possible causes

Supraventricular Tachycardia with severe cardiopulmonary compromise

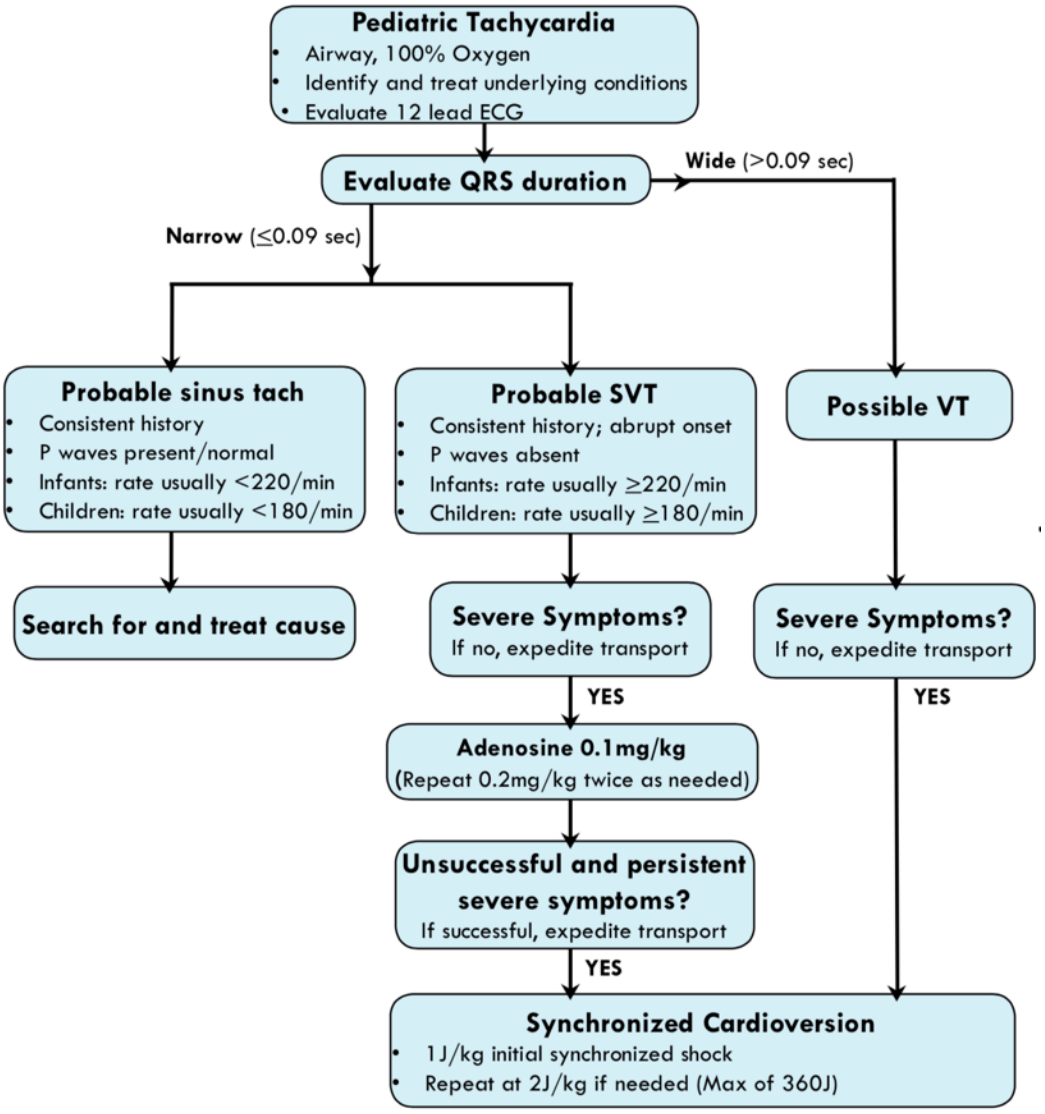
- Infants: rate usually ≥ **220/min**
- Children: rate usually ≥ **180/min**
- If vascular access is available:
    - *Adenosine* (Adenocard) 0.1 mg/kg (Max individual dose: 6 mg) IV rapid bolus
    - Repeat *Adenosine* (Adenocard) twice at 0.2 mg/kg if needed (Max individual dose: 12 mg) IV rapid bolus
- If *Adenosine* is unsuccessful and patient still has severe cardiopulmonary compromise:
    - Synchronized Cardioversion at 1 J/kg
    - If unsuccessful and severe symptoms persist, repeat Synchronized Cardioversion at 2 J/kg (Max individual dose: 360 J)
- Expedite transport

Ventricular tachycardia with a pulse

- If the patient is stable, provide supportive care and expedite transport
- If the patient becomes unstable (hypotension and acutely altered mental status):
    - Synchronized Cardioversion at 1 J/kg
    - If unsuccessful and severe symptoms persist, repeat Synchronized Cardioversion at 2 J/kg (Max individual dose: 360 J)
- If Torsades de Pointes is suspected:
    - *Magnesium Sulfate* 50 mg/kg IV over 5-10 minutes

Cardiac Arrhythmia - Pediatric

Pediatric Care



Overdose, Poisoning, Ingestion - Pediatric

Pediatric Care

MANAGEMENT

For any overdose or poisoning, contact should be made with the Regional Poison Control Center (1-800-222-1222). Whenever possible, determine the agent 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 an overdose is suspected:
  - *Naloxone* (Narcan) 0.1 mg/kg (max: 2 mg) IV/IO/IM
- ***Treatment for specific toxic exposures is indicated only when patients are clearly symptomatic. In the absence of significant symptoms, monitor closely and expedite transport. If indicated, initiate HAZMAT Alert***

Cholinergics / Organophosphates

Symptoms include dyspnea, bronchorrhea, lacrimation, vomiting/diarrhea, weakness, paralysis, seizures

- *Atropine*
  - 12 years: *0.05 – 0.1 mg/kg/dose* IV/IO. Repeat by doubling dose every 3 min if previous dose did not induce response. Titrate to bronchial secretions.
  - >12 years: *2 mg IV/IO*. Repeat by doubling dose every 3 min if previous dose did not induce response. Titrate to bronchial secretions.
- If seizures present, see "Seizure - Pediatric" Protocol

Tricyclic Antidepressant

Symptoms include hypotension, arrhythmias, wide QRS complex (> 0.09 sec)

- *Sodium Bicarbonate* 1 mEq/kg IV
  - May be repeated in 10 minutes

Calcium Channel Blockers and Beta Blockers

Symptoms include bradycardia, hypotension, and heart block

- *Glucagon* 0.5 mg (< 20 kg) or 1 mg (≥ 20 kg) IM/IV
- If hypotensive, 0.9% NaCl 20 mL/kg IV bolus
- If symptoms persist, *Atropine* 0.02 mg/kg (min: 0.1 mg, max: 0.5 mg) IV
- If poisoning due to calcium channel blocker, *Calcium chloride (10%)* 20 mg/kg IV (Max individual dose: 1 g)

Dystonic Reaction

Acute uncontrollable muscle contractions

- *Diphenhydramine* (Benadryl) 1 mg/kg (max: 50 mg) IV/IM

Insulin Reaction

Hypoglycemia and altered mental status due to excessive insulin

- Check blood glucose and treat glucose < 70 mg/dL
  - *D10W* at 5 mL/kg for children < 1 year old (Max: 50 mL)

- Waste 40 mL of D50 and draw up 40 mL of NS.
- *D25W* at 2 mL/kg for children 1-8 years old (Max: 50 mL)
  - Waste 25 mL of D50 and draw up 25 mL of NS
- *D50W* at 1 mL/kg for children ≥ 9 years old (Max: 50 mL)
- If no IV access, *Glucagon* 0.5 mg (< 20 kg) or 1 mg (≥ 20 kg) IM

Pain Management - Pediatric

Pediatric Care

MANAGEMENT

Advanced Life Support

- Analgesic agents may be administered if patient has severe pain and one of following:
  - Isolated extremity injury
  - Burn without airway, breathing, or circulatory compromise
  - Typical sickle cell crisis for patient
  - Animal bite or envenomation
- Agents for pain control:
  - *Fentanyl* (Sublimaze) 1 mcg/kg (max: 50 mcg) slow IV. May repeat after 10 minutes (max total dose: 100 mcg)
    - **OR** 1.5 mcg/kg (max: 100 mcg) intranasal via MAD (divide dose equally between nostrils)
    - Preferentially use intranasal delivery via MAD for those where IV access may be difficult to obtain in a timely fashion
  - *Morphine* 0.1 mg/kg IV (max: 5 mg) IV
    - May repeat once after 10 minutes PRN (max total dose: 10 mg)
    - Contraindicated if systolic BP < 100 mmHg
- Assess and record the patient's pain level after medication
- Note adequacy of ventilation and perfusion
- Record and monitor continuous O_2 saturation and etCO_2

Seizure - Pediatric

Pediatric Care

MANAGEMENT

Basic Life Support

- Supplemental 100% oxygen if active seizures
- Blood glucose check

Advanced Life Support

- Full Pediatric ALS Assessment and Treatment
- Check blood glucose and treat glucose < 70 mg/dL
    - *D10W* at 5 mL/kg for children < 1 year old (Max: 50 mL)
        - Waste 40 mL of D50 and draw up 40 mL of NS.
    - *D25W* at 2 mL/kg for children 1-8 years old (Max: 50 mL)
        - Waste 25 mL of D50 and draw up 25 mL of NS
    - *D50W* at 1 mL/kg for children ≥ 9 years old (Max: 50 mL)
    - If no IV access, *Glucagon* 0.5 mg (< 20 kg) or 1 mg (≥ 20 kg) IM/IV
    - If hypoglycemia persists:
        - Repeat blood glucose check with a different glucometer
        - Repeat *Dextrose* (as above) once if blood glucose < 70 mg/dL after 10 minutes
- For active seizures only, choose one of the following options:
    - Do NOT delay treatment to obtain intravenous access, begin with IM dose unless IV is already established
    - *Midazolam* (Versed) 0.2 mg/kg (max: 5 mg) IM **OR** 0.2 mg/kg (max: 5 mg) intranasal via MAD **OR** 0.1 mg/kg (max: 2.5 mg) IV
        - Wait at least 5 minutes from initial dose.
        - If seizures continue or re-occur 5 minutes after initial dose, repeat <u>once</u> *Midazolam* (Versed) 0.2 mg/kg (max: 5 mg) IM **OR** 0.2 mg/kg (max: 5 mg) intranasal via MAD **OR** 0.1 mg/kg (max: 2.5 mg) IV

      OR
    - *Diazepam* rectal gel (Diastat®) if available: Some patients with a diagnosed seizure disorder will have their own *Diazepam* rectal gel (Diastat®) prescribed by their physician. When available, Diastat® can be given if no IV is available. Use the patient's prescribed dose or refer to the table below. If an IV is readily available, *Midazolam* is the preferred medication.

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

6 – 11 years old (0.3 mg/kg)		
Weight		**Dose**
(kg)	**(lbs)**	**(mg)**
10-18	22-41	5
19-37	42-82	10
38-55	83-122	15
56-74	123-164	20

- Alternative: *Lorazepam* (Ativan) 0.1 mg/kg IV/IM (max: 2 mg)
  - Wait at least 5 minutes from initial dose.
  - If seizures continue or re-occur 5 minutes after initial dose, repeat once *Lorazepam* (Ativan) 0.1 mg/kg (max: 2 mg) IV

MANAGEMENT

Basic Life Support

- 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
- Prevent loss of body heat

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 if criteria are met
- 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, 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 2nd intercostal space, mid-clavicular line, above the third rib**
- Initiate transport to an appropriate trauma facility within 10 minutes of arrival on the scene, unless extenuating circumstances (e.g., extrication)
- Perform procedures, history, and detailed physical examination en route to the hospital
- Reassess frequently

Burns

Basic Life Support

- Remove or cool heat source if present (tar, clothing)
- Cool compress dressings on minor burns with sterile saline (do not use ice packs)
- Dry, sterile burn sheet on:
    - 2° burns greater than 15% of Total Body Surface Area
    - 3° burns
    - Electrical and chemical burns (chemical burns should be thoroughly irrigated; refer to "Hazardous Materials Exposure: Chemical Burns and Dermal Exposure" Protocol)
- Spinal immobilization if high voltage electrical injuries (> 1000 volts)
    - If high voltage electrical injury (> 1000 volts), initiate **TRAUMA ALERT**

Advanced Life Support

- If moderate or severe pain and no signs of shock (normal cap refill, normal blood pressure for age):

- *Fentanyl* (Sublimaze) 1 mcg/kg (max: 50 mcg) slow IV. May repeat after 10 minutes (max total dose: 100 mcg)
  - **OR** 1.5 mcg/kg (max: 100 mcg) intranasal via MAD (divide dose equally between nostrils)
  - Preferentially use intranasal delivery via MAD for those where IV access may be difficult to obtain in a timely fashion (extremity burns / injuries)
  - Use with **caution** if inhalational injuries or respiratory symptoms
- Alternative**:** *Morphine* 0.1 mg/kg (max: 5 mg) IV
  - May repeat once after 10 minutes PRN (max total dose: 10 mg)
  - Contraindicated if systolic BP < 100 mmHg

- Expedite transport to nearest Trauma Center if Trauma Red or **TRAUMA ALERT**

Open Fractures

Basic Life Support

- Remove or cut away clothing to expose area of injury
- Control active bleeding, refer to "Control of External Bleeding" Protocol
- Gross contamination, such as leaves or gravel, should be irrigated or removed if possible
- Open wounds/fractures should be covered with moist sterile dressings
- Check distal pulses, capillary refill, sensation, motor prior to splinting
  - If pulse present, splint in position found, if possible
  - If pulse absent, attempt to place the injury into anatomical position
- Check distal pulses, capillary refill, sensation, motor after splinting

Advanced Life Support

- For Pediatric with suspected open fracture:
  - Cefazolin (Ancef) 0.35 mg/kg (max 2 g) IV/IO as infusion over 10 minutes ***or*** as slow IV Push over 3-5 minutes
    - Reconstitute 1 gram vial by injecting 2.5 mL NS into vial (creates concentration of 330 mg/mL)
    - Infusion (**may only use for peds age 7 and above**): Withdraw appropriate weight-based dose from reconstituted vial with syringe, dilute in 100 mL NS bag, and administer as infusion over 10 minutes {10 gtt set (100 gtts/min)}
    - **OR** IV Push (**may use for peds any age**): Withdraw appropriate weight-based dose from reconstituted vial with syringe, dilute in 10 mL NS, and administer as slow IV push over 3-5 minutes
    - Contraindications: known hypersensitivity reaction to Cephalosporins (e.g. Cefazolin, Cefadroxil, Cephalexin, Ceftriaxone, Cefepime) or anaphylaxis to Penicillins (e.g. Amoxicillin, Ampicillin, Nafcillin)

Pediatric Trauma Alert Criteria

The presence of any of the 4 listed items below requires TRAUMA ALERT activation:

- ☐ Meets color coded triage system (any one RED, or any two BLUE criteria met)
- ☐ GCS ≤ 12 (GCS is a stand-alone criteria, even if color coded criteria not met)

- ☐ Meets Local Criteria:
  - High Voltage Electrical Injury (> 1000 volts)
  - A neck laceration with swelling, sustained bleeding, escape of air from wound, or stridor. (Any other neck laceration – transport to the nearest trauma center, but do not trauma alert)
- ☐ Patient does not meet any above criteria but, in the judgement of the paramedic, should be transported as a **TRAUMA ALERT**. Document reason on run report.

Component	BLUE Criteria	RED Criteria
Size	**Any of the following:** • Weight ≤ 11 kg • Length ≤ 33 in. (Broselow)	N/A
Airway	N/A	Assisted Ventilation or Intubated[1]
Consciousness	**Any of the following:** • Amnesia • Loss of consciousness	**Any of the following:** • Altered mental status[2] • Coma • Suspicion of spinal cord injury (Paralysis, Loss of sensation)
Circulation	**Any of the following:** • Palpable carotid or femoral pulse, but absent radial or pedal pulse • SBP < 90 mmHg	**Any of the following:** • Faint or non-palpable carotid or femoral pulse • SBP < 50 mmHg
Fracture	• Single closed long-bone fracture[3]	**Any of the following:** • Open long bone fracture[3] • Multiple fracture sites
Cutaneous	N/A	**Any of the following:** • Major soft tissue disruption or flap avulsion[4] • 2° or 3° to ≥ 10% TBSA • Amputation[5] • Penetrating injury to head, neck, or torso[6]

1. Includes jaw thrust, frequent suctioning, or other airway adjuncts
2. Includes drowsiness, lethargy, inability to follow commands, unresponsiveness
3. Includes humerus, radius+ulna, femur, tibia+fibula; does not include isolated wrist and ankle fractures
4. Major degloving injuries
5. Amputations proximal to wrist or ankle
6. Excluding superficial wounds where depth can be accurately determined

In the event that that none of the above criteria are met, a paramedic may activate a TRAUMA ALERT if in his or her judgment, the condition warrants such action. High-risk features / mechanisms to consider include:

_____ Falls > 6 ft. or 3 times patient's height
_____ Extrication time > 15 min.
_____ Rollover MVC
_____ Death of an occupant in the same passenger compartment
_____ Pedestrian or bicyclist struck by vehicle (Pediatric < 5 mph)
_____ Open or depressed skull fracture
_____ Suspected flail chest
_____ Suspected unstable pelvic fracture

_____ Major intrusion: > 12 inches passenger space intrusion, > 18 inches in any other site
_____ MVC with ejection
_____ Ejection from motorcycle, ATV, horse, etc.
_____ Blast or explosion
_____ Motorcycle crash > 20 mph or with separation of rider from motorcycle

Section 5. Procedure Manual

12 lead ECG

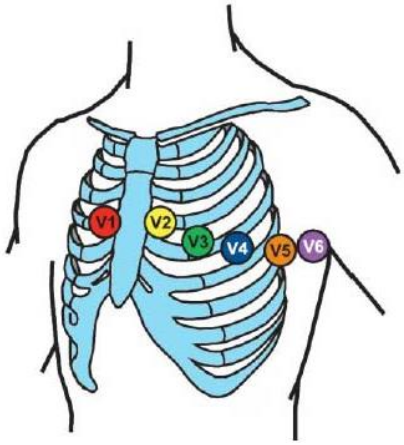
Procedures

Indications:

- Indications for a 12 lead ECG include: chest pain, thoracic back pain, epigastric pain, AMS, SOB, diaphoresis, syncope, CHF, symptomatic diabetics, symptomatic dialysis patients, and any overdose patient.
- Paramedic discretion may allow for a 12 lead ECG on any patient.

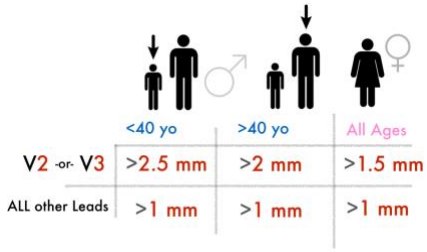
Technique:

- A 12 lead ECG is composed of electrodes RA, RL, LA, LL, and V1-V6. These are placed as follows:
  - RA - Between the right shoulder and the elbow
  - RL - Above the right ankle and below the torso
  - LA - Between the left shoulder and the elbow
  - LL - Above the left ankle and below the torso
  - V1 - 4th intercostal space right of the sternum
  - V2 - 4th intercostal space left of the sternum
  - V3 - Between V2 and V4
  - V4 - 5th intercostal space at the midclavicular line
  - V5 - Anterior axillary line, same level as V4
  - V6 - Midaxillary line, same level as V4 and V5
- Print 2 copies of each 12 lead ECG (1 for EMS report, 1 for hospital)



Acute Interpretation:

- Suspect ST elevation MI if:
  - Men < 40: 2.5 mm ST-elevation in V2 or V3, 1 mm in any other lead
  - Men > 40: 2.0 mm ST-elevation in V2 or V3, 1 mm in any other lead
  - Women: >1.5 mm ST-elevation in V2 or V3, 1 mm in any other lead
- Three stages of acute MI:
  - T wave inversion = Ischemia
  - ST depression = Injury
  - ST elevation = Infarct
- ECG territories - use the "ISAL" mnemonic:
  - Inferior (II, III, aVF)
  - Septal (V1, V2)
  - Anterior (V3, V4)
  - Lateral (I, aVL, V5, V6)



Note:

Our goal is to obtain an ECG for all patients presenting with chest pain or an anginal equivalent (as listed above) within 5 minutes. If evidence of inferior MI (ST changes in II, III, aVF), obtain right-sided chest ECG utilizing V4R. If change in V4R, refer to "Chest Pain – Suspected Cardiac Ischemia". Notify receiving facility with any significant findings ASAP in report (i.e., issuing a STEMI alert to the nearest appropriate hospital). Do not delay critical patient care to obtain 12 lead ECG.

Basic Airway Adjuncts

Bag-Valve-Mask (BVM):

Indications:

- Assisted ventilation for both adult and pediatric patients.

Technique:

- Create a good seal between mask and the patient's face by using one- or two-person technique
- Assure the mask is properly sized for the patient's face

Oropharyngeal Airway (OPA) and Nasopharyngeal Airway (NPA)

Indications:

- Assist in maintaining an open airway in patients with inadequate breathing
- ***OPA*** is indicated only in patients with ***no gag reflex***
- ***NPA*** can be used in patients with an ***intact gag reflex*** or clenched jaw
    - **Note**: NPA should **not** be used in patients with suspected head/facial trauma.

Technique (OPA):

- Choose the correct size OPA by measuring "lip to lobe".
- In an adult, insert the OPA upside down until resistance is met, then rotate 180° and advance until flange is at the lips
- For pediatric patients, use a tongue depressor to guide the OPA into position right side up

Technique (NPA):

- Choose the proper size by measuring from nose to lobe
- Lubricate the NPA and insert into the nostril while pushing the tip of the nose upward.
- Gently advance until the flange rests against the nostril.
- Contraindicated if suspected facial fractures or suspected basilar skull fractures (raccoon eyes, battle sign, blood from ear canal)

Complications:

- Regurgitation and aspiration of gastric contents

Oxygen Therapy

Indications:

While it is not necessary to reach 100% SpO_2, blood oxygen should be maintained > 94%. Oxygen should be administered to patients who:

- Display signs and symptoms of hypoxia
- Present in hypotensive states
- Have suffered major trauma
- Present as acutely ill (shortness of breath, respiratory distress, chest pain, shock, trauma, seizure, stroke, altered mental status)
- Are suspected of carbon monoxide inhalation (regardless of SpO_2 reading)
- Are pregnant with suspected fetal hypoxia
- Patients who normally receive oxygen as part of their usual medical care
- Any patient who you suspect may become hypoxic due to mechanism of injury or nature of illness, regardless of oxygen saturation level
- **If patient is able to maintain SpO_2 > 94%, you may elect not to administer**
- Note**:** Patients who are suspected of having a CVA, or who present with chest pain, should only receive oxygen if room air SpO_2 < 94%, unless they present with a reason to require higher concentrations.
- Note: If O_2 is required, provide the lowest concentration to maintain SpO_2 ≥ 94%. Hyperoxia (SpO_2 at 100% on supplemental oxygen) can be detrimental to patients. Refrain from allowing SpO_2 to remain at this level.

The following patients **should be given oxygen regardless of their SpO_2**

- **Suspected carbon monoxide exposure** - Patients exposed to carbon monoxide (CO) – such as smoke or automobile exhaust exposure in an enclosed space, malfunctioning heaters, etc. – should **always** receive 100% oxygen. In this case, measured oxygen saturation may be unreliable and the high-concentration oxygen will help displace CO from hemoglobin. Oxygen may be administered via non-rebreather mask, BVM, or ETT as appropriate
- **Pneumothorax** - Patients with a known or suspected pneumothorax should receive 100% oxygen regardless of SpO_2
- **Patients prescribed oxygen for their usual medical care**

Technique:

Methods of administration include:

- Nasal cannula
- Non-rebreather
- BVM (bag-valve-mask)
- Endotracheal tube / iGel / supraglottic airway
- CPAP/BiPap
- Blow-by (infants who are easily agitated)

Endotracheal Intubation

Airway Procedures

Procedures

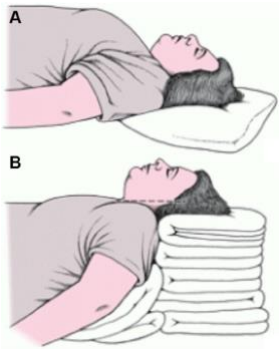
Indications:

- Respiratory or cardiac arrest
- Inadequate ventilation with bag-valve-mask
- Impending respiratory failure or apnea
- Hypoxia unresponsive to 100% oxygen, and any of the following:
    - Respiratory rate < 8 breaths per minute
    - Poor ventilatory effort (with hypoxia unresponsive to 100% oxygen)
    - Inability to maintain patent airway
    - Airway obstruction

Equipment:

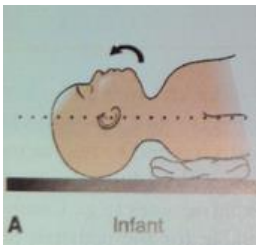
- Laryngoscope handle with appropriate sized blade
- Proper size endotracheal tube (ETT) + back-up ETT 0.5 – 1.0 mm smaller
- Water-soluble lubrication gel (lubricate distal end of tube at cuff)
- 10-12 mL syringe
- Stylet (insert into ETT and do not let stylet extend beyond tip of ETT)
- ETT securing device
- Proper size oral pharyngeal airway
- BVM or automatic ventilator
- Oxygen source
- Suction device
- Stethoscope
- Digital capnography and oxygen saturation monitors

Technique:



- Use caution when intubating any patient with suspected tracheal/laryngeal injury
- Assure all equipment is readily accessible and functioning. Prepare suction unit.
- Inflate the cuff of the endotracheal tube to check for leaks
- With the stylet in place, maintain the tube's natural curve or reshape into "hockey stick" shape
- If possible adjust the bed height so that the patient's head is level with the lower portion of your sternum
- Unless there are contraindications, move the patient into the "sniffing" position by placing a pillow or folded towel under the patient's occiput
    - If cervical spine precautions are required (any patient with possible trauma), **remove the c-collar** and utilize a rescuer to maintain **manual** c-spine alignment

- ***Patient's ear should be level with sternal notch***
- When intubating an infant, you may need to consider providing support underneath the shoulders, because of the infant's large occiput.
- If the clinical situation allows, pre-oxygenate the patient with a non-rebreather mask or a bag-valve-mask for at least 3 minutes prior to intubation
    - This step may minimize the need for BVM ventilation, thus reducing the risk of aspiration



- While holding the laryngoscope in your left hand, open the patient's mouth with your right hand
- Insert the laryngoscope blade to the right of the patient's tongue and gradually move the blade to the center of the mouth, pushing the tongue to the left
- Slowly advance the blade along the tongue and locate the epiglottis
    - If using a curved blade, place the blade tip into the vallecula
    - If using a straight blade, place the blade tip posterior to the epiglottis
- With the tip of the blade in position, lift the laryngoscope upward and forward at a 45 degree angle to expose the vocal cords. **NEVER rock the blade, pull, or rotate back.**
- Try to achieve the best possible view of the vocal cords before attempting to pass the endotracheal tube
- To avoid dental injury, do not rock the blade against the patient's teeth. This will do nothing to improve the view
- While maintaining your view of the vocal cords, insert the ETT into the right side of the patient's mouth
- The tube should not obstruct your view of the vocal cords during this critical part of the procedure
    - Consider the use of a **bougie** when cords are not well visualized
- Pass the tube through the vocal cords until the balloon disappears into the trachea
- Advance the tube until the balloon is 3 to 4 cm beyond the vocal cords
    - Typical depth in centimeters is "3 times the tube size" (e.g. 21 cm for a 7 mm tube, 24 cm for a 8 mm tube)
- Inflate the endotracheal balloon with air. Assess for proper placement using capnography
    - Do not let go of the tube until properly secured
    - **$etCO_2$ is the gold standard for confirmation**
    - If no alveolar waveform is seen on capnography, the tube ***must be removed***
- Secondary assessment of placement should include auscultation over the epigastrium, auscultation of both lungs fields for symmetry, observation of adequate chest rise
- If an alveolar waveform is present, secure the tube using a commercial tube holder
- Each time patient care is transferred to another provider, **tube placement should be verified and documented by both parties** with confirmation of **positive $etCO_2$ waveform capnography**
- **Any time $etCO_2$ waveform capnography is no longer present, endotracheal tube must be immediately removed,** with concerns that the tube has become displaced into the esophagus

Complications:

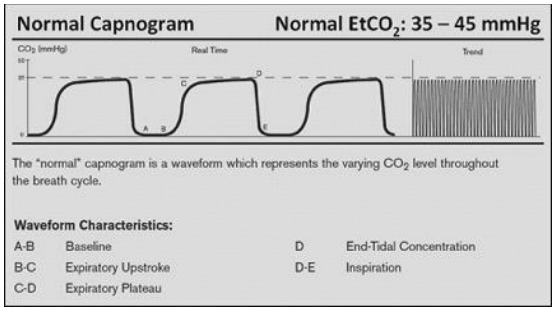
- Esophageal intubation (catastrophic if unrecognized)

- Aspiration of gastric contents
- Bradycardia
- Oral trauma
- Exacerbation of spine injuries

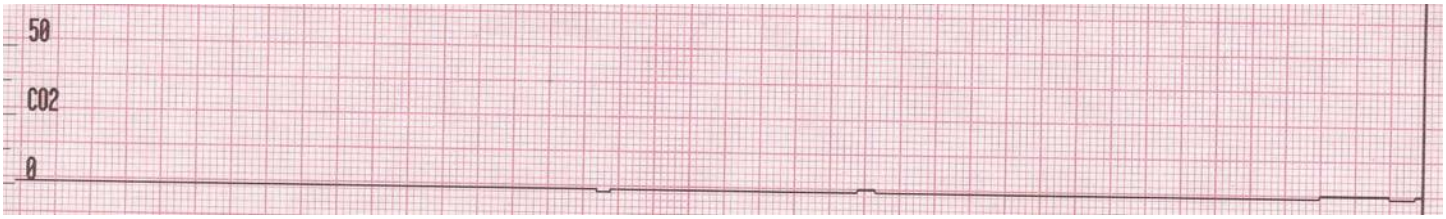
$etCO_2$ Monitoring using Capnography

Waveform capnography is the most sensitive and specific method available to objectively determine endotracheal tube location after intubation attempts and throughout airway management in the field.

Following intubation, immediately attach capnography line and observe for presence of a four-phase alveolar waveform:



An alveolar waveform confirms ventilation is occurring. In the intubated patient, an alveolar waveform confirms tracheal placement of the tube. In a non-intubated patient, capnography provides continuous monitoring of respirations, and is the most sensitive method for recognizing impending respiratory failure. **Pay more attention to the $etCO_2$ trend than the actual number.**



A flat line indicates NO VENTILATION is occurring. In the intubated patient, this indicates a misplaced esophageal intubation. In the non-intubated patient, a flat line indicates respirations have ceased (hypoventilation/apnea).

In states of hypoperfusion, such as severe shock or cardiac arrest, end-tidal carbon dioxide ($etCO_2$) levels will be very low (< 20 mmHg). In cardiac arrest patients, high quality chest compressions improve perfusion and increase $etCO_2$ - monitor these levels to maintain optimal CPR and recognize operator fatigue. A sudden rise in the $etCO_2$ indicates return of spontaneous circulation (ROSC).

End-tidal carbon dioxide ($etCO_2$) provides valuable information about ventilation (respiration), perfusion (cardiovascular), and the metabolic status of the patient. Normal values fall into a range of 35-45 mmHg.

Elevated $etCO_2$ levels indicate:

- In intubated patients
  - Hypoventilation – increase volume and rate of bagging if this occurs
  - Partial airway obstruction – reassess airway and tube if this occurs
- All patients
  - Bronchoconstriction/CO_2 retention such as asthma or COPD (especially if waveform has "shark-fin" appearance)
  - Hypoventilation in spontaneously breathing sedated or unconscious patients – assess for airway management
  - ROSC (sudden rise of $ETCO_2$ during cardiac arrest resuscitation)

Decreased $etCO_2$ levels indicate:

- In intubated patients
  - A sudden decline in $etCO_2$ indicates extubation or obstructed tube – immediately assess patient for each of these complications
  - Hyperventilation – decrease volume and rate of bagging if this occurs
- All patients
  - Hypoperfusion such as severe sepsis or shock
  - Cardiac arrest or impending cardiac arrest
  - Metabolic acidosis such as diabetic ketoacidosis (DKA) or severe dehydration
  - Hyperventilation as seen in significant dyspnea, pulmonary embolism, or anxiety

Note:

Uses of $etCO_2$ capnography are multiple and include:

- **ET tube placement** (you must still assess lung sounds)
  - Note that capnography cannot detect right mainstem intubation
- **Perfusion warning sign** (shock)
  - Decrease in CO_2 (regardless of any change in breathing)
- **Ventilating head injury patients** (therapeutic hyperventilation)
  - Recommended $etCO_2$ range is 35 to 40
- **Diabetic ketoacidosis** (DKA)
  - CO_2 may be decreased from patient efforts to blow off acidosis
- **Hyperthermia**
  - Increase in CO_2 from metabolic overdrive
- **Anxiety**
  - Coach patients to slow their breathing by having them focus on the CO_2 value and challenge them to increase the number
- **Accurate respiratory rate**

  - Many medical professionals do poorly on recording exact respirations
  - Provides accurate trend of respirations
- **Asthma/COPD**
  - Mild asthma: CO_2 may drop (patient hyperventilates)
  - Worsening asthma: CO_2 may rise with the severity. Can indicate tiring and little air movement (dangerous levels > 60)
  - A steadily rising $etCO_2$ (as the patient begins to hypoventilate) may indicate the need for assisted ventilations or intubation
- **Monitoring sedated or altered patients**
  - Identification of hypoventilation or apnea before changes in SpO_2 or observed respiratory rate
- **Effectiveness of resuscitation efforts**
  - CPR effectiveness: increased blood flow to lungs = increased $etCO_2$ (CPR is necessary to generate a waveform in arrest)
  - Loss of ROSC: significant drop in a stabilized $etCO_2$ value for recently resuscitated patients may prompt the rescuer to re-check pulses
  - Prediction of futility: $etCO_2 < 10$ accurately predicts death when measured 20 minutes after ACLS procedures are initiated and patient is exhibiting PEA/asystole
  - ROSC: CO_2 values may increase rapidly and often overshoot baseline values when circulation is restored
- **Hypoxic Drive**
  - If CO_2 values steadily rise in a patient with COPD, it may be an alert to back off O_2 before patient becomes obtunded

Supraglottic Airway - iGel

Indications:

- Critical patient, where time is limited, resources are limited, and/or other resuscitative measures hold priority (i.e. trauma, cardiac arrest, etc)
- Apneic patient when endotracheal intubation is not possible or not available
- Patient must be **unconscious, without a gag reflex**
- No history of esophageal foreign body, disease, or caustic ingestion
- Failed airway

Contraindications/Precautions:

- Obstructive lesions below the glottis
- Trismus, limited mouth opening, pharyngo-perilaryngeal abscess, trauma, or mass
- Conscious or semi-conscious patients with an intact gag reflex
- Do not allow peak airway pressure of ventilation to exceed 40 cm H_2O
- Do not use excessive force to insert the device

- As with all supraglottic airway devices, particular care should be taken with patients who have fragile and vulnerable dental work, in accordance with recognized airway management
- Use care to avoid the introduction of lubricant in or near the ventilatory openings

iGel size	Patient size	Patient weight guidance (kg)
1	Neonate	2 – 5
1.5	Infant	5 – 12
2	Small pediatric	10 – 25
2.5	Large pediatric	25 – 35
3	Small adult	30 – 60
4	Medium adult	50 – 90
5	Large adult	90+

Technique:

- Pre-oxygenate with BVM
- Grasp the lubricated i-Gel firmly along the integral bite block (tube portion of the device). Position the device so that the i-Gel cuff outlet is facing toward the chin of the patient.
    - NOTE: be sure that there is only a thin layer of lubricant on the end of the i-Gel to avoid blowing it into the lungs with bagging
    - Suction the upper airway PRIOR to insertion as needed
- The patient should be in the "sniffing" position, with head extended and neck slightly flexed forward. The chin should be gently pressed down/inferior before proceeding to insert the i-Gel.
    - **CAUTION:** If cervical injury is suspected, use modified "jaw thrust" instead of any flexion at the neck.
- Insert the leading soft tip into the mouth of the patient toward the hard palate.
- Glide the device downwards and backwards along the hard palate with a continuous, but gentle, push until a definitive resistance is felt.
    - WARNING: Do not apply excessive force on the device during insertion. It is not necessary to insert your fingers or thumbs into the oral cavity of the patient during insertion of this device. If there is resistance during insertion, a 'jaw thrust' and slight rotation of the device is recommended.
    - You should meet "two points of resistance" during placement of the i-Gel.
- The tip of the device should be located in the upper esophageal opening and the cuff should be located against the laryngeal framework. The incisors should be resting on the integral bite block.
- Begin ventilation with 100% oxygen, while bagging patient to assess ventilation.
- Auscultate breath sounds, check for chest rise, and confirm placement with $etCO_2$ and SpO_2 monitoring
- Secure the tube with included manufacturer's securing device.
- Consider the use of a cervical collar in patients with an inserted i-Gel device to prevent tube dislodgement.

Complications:

- Aspiration of gastric contents

Surgical Cricothyrotomy (adult, children ≥ 12 years)
Needle Cricothyrotomy with jet ventilation (children < 12 years)

Indications:

- Inability to secure an airway using nonsurgical methods
- As a last resort in a "cannot intubate, cannot ventilate" scenario
- Needle cricothyrotomy is the surgical airway of choice for children less than 12 years old.

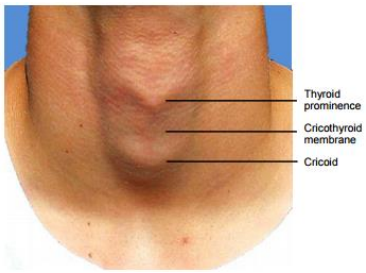
Contraindications:

- In true emergencies, there are no absolute contraindications
- Airway obstruction distal to the cricoid membrane
- Inability to identify anatomical landmarks
- Infection at the incision site

Equipment:

- Cricothyrotomy
  - Cuffed endotracheal tubes (5.0 – 6.0 mm)
  - Betadine or other antiseptic
  - Scalpel, No. 11
  - 10 - 12 mL syringe
  - 4 x 4 gauze/sponges
  - Gum elastic introducer (bougie)
  - Securing device
  - Cardiac monitor, SpO_2, $etCO_2$
  - Suction
  - Oxygen source
  - BSI precautions
  - BVM device
- Needle cricothyrotomy
  - Over-the-needle catheter, 14 ga, 2 to 2.5 inches in length
  - Betadine or other antiseptic
  - 10 or 12 mL normal saline flush syringe
  - Endotracheal tube adapter from 3.0 Fr endotracheal tube
  - Meconium aspirator
  - Tape to secure the device
  - 4 x 4 gauze/sponges
  - Oxygen tubing or suction tubing with Y-connector

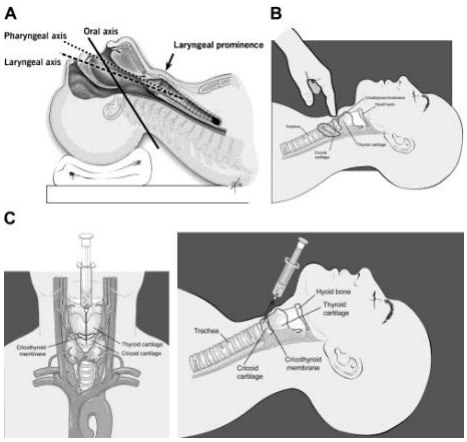
- Cardiac monitor, SpO_2, $etCO_2$
- Suction
- Oxygen source
- BSI precautions



Cricothyrotomy Technique:

- Determine the need for surgical cricothyrotomy
- Prepare equipment (check ETT, suction on and ready, BSI, oxygen on with adequate volume)
- Position the patient supine, with the neck in a neutral position
- Identify the cricothyroid membrane, between the thyroid and cricoid cartilage
- Clean the patient's neck using antiseptic swabs
- Using the non-dominant hand, stabilize the trachea
- Make a 2-3 cm superficial midline **vertical incision through the skin** over the cricothyroid membrane to expose thyroid cartilage and cricothyroid membrane
- Make a 1-2 cm **horizontal incision <u>through</u> the cricothyroid membrane**
- Dilate the opening
- Without removing the scalpel, insert a bougie through the incision site into the trachea towards the feet to maintain the airway
- Insert ETT (5.0 or 6.0) over the bougie and inflate cuff
- Ventilate patient using Ambu bag and ETT
- Confirm placement using waveform capnography (mandatory) and by assessing chest rise, lung sounds, SpO_2
- Control hemorrhage
- Secure the tube and monitor for possible complications
- Document location of where tube was secured

Needle Cricothyrotomy Technique:



- Determine the need for needle cricothyrotomy
- Prepare equipment (suction on and ready, BSI, oxygen on with adequate volume)
- Position the patient supine, with the neck in a neutral position
- Identify anatomy and landmarks. Identify the cricothyroid membrane, between the thyroid and cricoid cartilage
- Clean the patient's neck using antiseptic swabs
- Attach an over-the-needle 14 gauge catheter to a 10 mL normal saline syringe
- Insert the needle into the cricothyroid membrane towards the patient's feet at an angle of 30 – 45°, while aspirating. When air is noted in the syringe, you have entered the trachea.
- Once air is aspirated, advance no further and attempt to pass the catheter over the needle

- If the catheter passes easily, advance the catheter until the hub rests at the skin surface. Slowly remove the needle and secure the catheter
- When catheter is secure, carefully connect catheter to a 3.0 Fr ETT adapter
- Next attach the meconium aspirator to the 3.0 Fr ETT adapter
- Then attach **suction tubing** (standard oxygen tubing will not fit) to the meconium aspirator at one end and the oxygen source at the other (O_2 flow at 15L unless a neonate or small toddler; in this case, start at 8L and titrate up as needed)
- Place finger over hole in aspirator until chest rise is noted then release to allow for expiration
- Repeat this at an appropriate respiratory rate
- Titrate respiratory efforts to **maintain SpO_2 > 94%**. $ETCO_2$ may be very high
- Needle cricothyrotomy is a temporizing measure only; expedite transport because ventilation will be suboptimal

Complications:

- Aspiration
- Hemorrhage
- Unrecognized misplacement
- Thyroid perforation
- Inadequate ventilation/hypoxia
- Esophageal or tracheal laceration
- Mediastinal or subcutaneous emphysema
- Vocal cord injury

Bougie (gum elastic introducer)

Indication:

The Gum Elastic Bougie is helpful in achieving endotracheal intubation when there is a restricted view of the glottic opening. It is not necessary to use on every patient, but it may be useful when a difficult airway is anticipated. The Bougie is not for "blind" intubation – you should always visualize the tip of the epiglottis, arytenoids, or a partial view of the vocal cords.

Technique:

- Once the best possible laryngeal view is obtained, pass the bougie into the patient's mouth and through the glottic opening
- If unable to visualize the vocal cords, advance the bougie anteriorly under the epiglottis and feel for clicks as it slides along/against the tracheal rings.
- While maintaining the best laryngeal view, slide the endotracheal tube over the bougie, and advance it to the desired depth, while maintaining proximal control of the bougie. This may require two operators.
- If resistance is encountered while passing the tube, try rotating the bougie and tube 90°

Complications:

- Esophageal intubation
- Vomiting and aspiration
- Laryngospasm
- Bronchospasm
- Oral trauma
- Exacerbation of spinal injuries

Continuous Positive Airway Pressure (CPAP)

Indication:

Continuous Positive Airway Pressure (CPAP) is a respiratory treatment that uses continuous air pressure and flow to assist breathing and keep the airways open. The CPAP device should be applied to patients who are in moderate to severe distress and exhibiting inadequate oxygenation or ventilation. This could be a result of pulmonary edema, pneumonia, COPD, etc.

Technique:

- Explain the procedure to the patient
- Ensure adequate oxygen supply to ventilation device
- Place the patient on continuous pulse oximetry, continuous etCO_2, and cardiac monitoring
- Place the delivery device over the mouth and nose
- Secure the mask with provided straps or other devices
- Use 5.0 cm H_2O of PEEP (pressure may be titrated up to 15 cm H_2O as needed)
- Check for air leaks
- Monitor and document the patient's respiratory response to treatment
- Monitor vital signs at least every 5 minutes. CPAP can cause BP to drop
- Continue to coach patient to keep mask in place and readjust as needed
- Remove device and consider advanced airway management if respiratory status deteriorates

Contraindications:

- Any alteration in mental status is a contraindication for use of CPAP
- Active vomiting
- Inability to fit mask onto patient (small adults or children)

Notes:

- An in-line bronchodilator nebulizer may be placed in the CPAP circuit if needed
- Do not remove the CPAP device until hospital therapy is ready to be placed on the patient

- Most patients will improve in 10 minutes. If there is no improvement within this time, consider increasing pressure or preparing for drug-facilitated airway management
- Watch patient for gastric distention (often presents as vomiting in conscious patients)

Bilevel Positive Airway Pressure (BiPAP)

Bilevel Positive Airway Pressure (BiPAP) is a form of non-invasive ventilation (NIV) that delivers alternating higher pressure during inhalation (IPAP) and lower pressure during exhalation (EPAP). This is in contrast to CPAP, which delivers one continuous pressure throughout inhalation and exhalation. In BiPAP mode, EPAP is a continuous pressure delivered throughout inhalation and exhalation – this is the exact same pressure as CPAP; however, when using BiPAP mode this continuous pressure is called either PEEP or EPAP rather than CPAP. In other words, PEEP, EPAP, and CPAP are referring to the same pressure. In BiPAP mode, a second pressure called ΔPsupport is also delivered, but this is only delivered during inhalation and it combines with the PEEP during inhalation to create the higher pressure called IPAP. The higher pressure during inhalation (IPAP) and the lower pressure during exhalation (EPAP) creates air flow due to the pressure differences. ΔPsupport is equal to the difference between these pressures. In other words, ΔPsupport plus PEEP equals IPAP. The airflow that is generated from ΔPsupport delivers tidal volume during inhalation which improves ventilation and work of breathing. The continuous lower pressure of PEEP increases SpO2 and oxygenation by continuously keeping the alveoli open. So, BiPAP improves both ventilation and oxygenation through ΔPsupport and PEEP, respectively. See 'Notes' section below to familiarize with BiPAP terminology.

Indication:

BiPAP should be considered early in patients with moderate to severe respiratory distress exhibiting inadequate oxygenation or ventilation. This could be a result of Pulmonary Edema/CHF, Pneumonia, COPD, or Asthma. BiPAP is particularly effective in patients with COPD and Asthma and should be used as the initial ventilatory support as it improves ventilation and oxygenation. CPAP is generally preferred over BiPAP in initial treatment of Pulmonary Edema, CHF and Pneumonia as it improves the oxygenation issue; however, if the patient has severe increase in work of breathing, then BiPAP can be considered as the initial choice. If starting with CPAP, the patient can always be escalated to BiPAP if needed.

Technique:

- Explain the procedure to the patient
    - Sample explanation: "I want to apply this mask that will make it easier for you to breathe. I promise this will help you if you work with the machine. All you have to do is focus on slow inhalations, and slow exhalations. I will start by holding the mask before securing it to make sure your breathing is improving"
- Position the patient in High Fowlers or Semi Fowlers to ensure maximal chest wall movement and to prevent airway obstruction
- Assure patent airway and spontaneous breathing
- Place the patient on continuous pulse oximetry, continuous etCO_2, and cardiac monitoring
    - The target range for etCO2 is between 35-45 mmHg
    - The target range for SpO2 is > 90%

- Ensure adequate oxygen supply to Hamilton-T1 Ventilator
- Connect breathing circuit to ventilator
- Power on ventilator and select BiPAP Mode
    - Select Male or Female and enter patient's estimated height in inches (vent automatically calculates Ideal Body Weight based on height and sex)
    - Set initial ΔPsupport and PEEP
        - Start with ΔPsupport of 5 cm H2O
        - Start with PEEP of 5 cmH2O
        - ***Initial settings are ΔPsupport of 5 and PEEP of 5****. Recall that PEEP and ΔPsupport add together during inhalation to create IPAP, so initial IPAP is 10. Recall that during exhalation only PEEP is delivered and PEEP is the same as EPAP, so initial EPAP is 5. The IPAP over EPAP results in a BiPAP setting of "10 over 5" aka 10/5*
    - Set Oxygen (FiO2) to 50%
    - Press Start Ventilation button
    - Place the BiPAP mask over the patient's mouth and nose and coach patient
    - Secure the mask to face with straps
    - Check for air leaks
- Adjust ΔPsupport, PEEP, and Oxygen as needed to decrease patient's respiratory effort and improve oxygenation
    - Increase ΔPsupport in increments of 1 cm H2O (max 10 cmH2O) and simultaneously increase the PEEP by increments of 1 cm H2O (max 10 cmH2O)
        - **If either ΔPsupport or PEEP is changed, the other parameter must be equally changed as well (i.e. If ΔPsupport is increased from 5 to 6, then PEEP must also be increased by an increment of 1 from PEEP of 5 to PEEP of 6, which would result in IPAP of 12 and EPAP of 6 as listed in table below)**
            - Start patient on initial settings listed in the far-left column of the table and assess patient's response. If increased settings needed, go over one column to the right and use the settings in that column. Continue moving right one column at a time as needed until patient improves or max values are reached. Use lowest setting that results in clinical improvement.

Hamilton BiPAP Setup (cmH2O)

ΔPsupport	5 (initial)	6	7	8	9	10 (Max)
PEEP	5 (initial)	6	7	8	9	10 (Max)
BiPAP (IPAP/EPAP)	10/5	12/6	14/7	16/8	18/9	20/10

        - **Total inspiratory pressure (IPAP) should never exceed 20 cmH2O**
    - Titrate Oxygen to maintain SpO2 > 90%
- Monitor and document the patient's respiratory response to treatment
    - If significant respiratory distress occurs, support the patient with a BVM and supplemental oxygen until arrival to destination facility

  - Discontinue if patient is too anxious and intolerant of mask
  - Discontinue if vomiting is induced
- Monitor vital signs at least every 5 minutes
  - BiPAP can cause BP to drop
  - Closely monitor continuous pulse oximetry
  - Closely monitor continuous etCO2
- Continue to coach patient to keep mask in place and readjust as needed
- Confirm the availability of a BiPAP device at the destination facility

Contraindications:

- Pediatric patients < 12 years of age
- Altered mental status **or** GCS ≤ 14
- Inability to maintain airway patency
- Circumstances in which endotracheal intubation or a surgical airway is indicated (impending Respiratory Failure)
- Agonal respirations or apneic patients
- Active vomiting or inability to clear secretions
- Cardiac and/or respiratory arrest
- Systolic blood pressure (SBP) < 100 mmHg
- Inability to remain in a sitting position
- Suspected pneumothorax
- Major trauma, especially facial trauma, head injury, or significant chest trauma
- Inability to good mask seal (small adults or children)
- Uncooperative patients after coaching

Notes:

- **Most patients will improve in 10 minutes. For circumstances in which the patient does not improve or continues to deteriorate despite BiPAP and/or medical therapy, terminate BiPAP administration and perform BVM ventilation and endotracheal intubation if necessary**
- An in-line bronchodilator nebulizer may be placed in the BiPAP circuit if needed
- **IPAP should not exceed 20 cmH2O (max setting for ΔPsupport is 10; max setting for PEEP is 10)**
- PEEP should never be higher than ΔPsupport
- PEEP = EPAP = CPAP
- IPAP = total inspiratory pressure
- IPAP = EPAP + ΔPsupport
- ΔPsupport = EPAP – IPAP
- ΔPsupport = pressure (additional to PEEP) applied during the inspiratory phase. Pressure support helps the patient counteract the flow resistance of the breathing circuit. It compensates for the decreasing tidal volume and rising respiratory rate of a spontaneously breathing patient
- PEEP and CPAP = Positive end expiratory pressure and continuous positive airway pressure; baseline pressure applied during the expiratory phase
- How to choose CPAP vs BiPAP: Is the patient having an oxygenation or ventilation issue?
  - Oxygenation issue: Pulmonary edema, Pneumonia, ARDS. These patients have problem with oxygenation due to presence of material in the alveoli blocking normal oxygen diffusion into the blood

stream. CPAP is a great first choice in these patients because they need PEEP to open up alveoli and improve oxygen exchange. They don't necessarily need inspiratory support as they typically are still able to ventilate air in and out their lungs
    - These patients may become fatigued and develop a ventilation problem due to increased work of breathing. In these cases, escalation to BiPAP would be beneficial as it also provides inspiratory support to decrease work of breathing in addition to the constant expiratory support from the PEEP
  - Ventilation issue: COPD, Asthma. These patients can get air in but they can't get air out, resulting in elevated pCO2 (obstructive process). These patients would benefit from BiPAP to improve ventilation which clears excess CO2. It's important to keep PEEP as low as possible in these patients due to difficulty with getting air out on exhalation. IPAP over EPAP 10/5 is the most common setting
    - If having severe obstruction with breath stacking and patient can't get air out, then can turn PEEP down or take mask off to decompress the lungs (remember that if PEEP is decreased then ΔPsupport must also be equally decreased)
    - If patient is getting fatigued where they feel like they aren't getting enough air in (etCO2 increasing), then can give more ΔPsupport to help with getting the breath in (must also equally increase PEEP)
- Hamilton T-1 Monitor Screen:
  - Ppeak (cmH2O) = Peak airway pressure. The highest pressure during the previous breath cycle. It is influenced by airway resistance and compliance. Ppeak may differ from IPAP if resistance is high. Without any airway resistance, this number would theoretically be the same as IPAP
  - MinVol NIV (l/min) = Expiratory minute volume. The average of the monitored expiratory volume per minute over the last 8 breaths. This is an adjusted parameter taking leakage into account
  - VTE NIV (mL) = Expiratory tidal volume. The volume exhaled by the patient. VTE NIV is an adjusted parameter taking leakage into account
  - fTotal (b/min) = Total breathing frequency. The average of the patient's total breaths over the last 8 breaths
- Controls Tab
  - Basic:
    - Plimit = The maximum allowed pressure to apply during ventilation. <u>This should not exceed 20 cmH2O</u>. The high Pressure alarm limit is always 10 cmH2O greater than Plimit **(Plimit parameter should never be changed)**
    - Flow trigger = The patient's inspiratory flow that triggers the ventilator to deliver a breath. The lower this number, the easier it is for the machine to trigger a breath. The default is 5.0 l/min (<u>In general, Flow trigger parameter should not be changed</u>; however, if patient is having difficulty triggering a ventilator breath, this may be decreased ***gradually*** to **minimum of 2.0 l/min**)
  - More:
    - P-ramp = Pressure ramp. Time required for inspiratory pressure to rise to the set pressure (aka the time it takes to rise from EPAP to IPAP). Shorter P-ramp settings (< 50 ms) provide higher initial flow rates and result in faster attainment of the target pressure. This may benefit patients with increased work of breathing. The default P-ramp is 70 ms (<u>In general, P-ramp should not be changed</u>; however, if patient is having difficulty tolerating the vent, may consider ***gradually*** decreasing to **minimum of 30 ms** in **<u>COPD/Asthma</u>**)
    - TI max = Maximum inspiratory time for flow-cycled breaths. The switchover from inspiration to exhalation in spontaneous breaths is normally controlled by the ETS setting. If gas leakage is

significant, however, the set cycle may never be reached. The TI max setting provides a backup so inspiration can be terminated. The ventilator switches over to exhalation when the set TI max is reached. The default is 1.50 s **(TI max parameter should not be changed)**

- ETS = (expiratory trigger sensitivity) is the percent of peak inspiratory flow at which the ventilator cycles from inspiration to exhalation. Increasing the ETS setting results in a shorter inspiratory time. The default is at 25%, meaning that when there is only one-quarter of the breath cycle left, it will transition to exhalation (In general, ETS should not be changed; however, if patient is having difficulty tolerating the vent, may consider ***gradually*** increasing to **maximum of 50% in COPD/Asthma**)
- Sigh = Breaths delivered at a regular interval (every 50 breaths) at a pressure up to 10 cmH2O higher than non-sigh breaths, as allowed by the Pressure alarm limit **(Always leave this disabled)**

- Apnea:
  - Backup = A function that provides ventilation after the adjustable apnea time passes without breath attempts. Default Backup mode is PCV+ **(Always leave this enabled)**
  - Automatic = If Automatic is enabled, control parameters are calculated based on the patient's IBW **(Always leave this enabled)**

- Alarms Tab:
  - Pressure = Low and high monitored pressure at the patient airway (Ppeak). If the high Pressure limit is reached or the device fails to reach the low Pressure limit, a high-priority alarm is generated. When pressure reaches the Plimit setting (high Pressure limit minus 10 cmH2O), inspiratory pressure is limited to this setting; the pressure is not increased further. If the delivered pressure is the same as the set high Pressure alarm limit, the device aborts the breath and reduces the pressure to PEEP level
  - ExpMinVol = Low and high expiratory minute volume. If either limit is reached, a high-priority alarm is generated
  - fTotal = Low and high monitored total breath rate (fTotal). If either limit is reached, a medium-priority alarm is generated
  - Vt = Low and high expiratory tidal volume, for two consecutive breaths. If either limit is reached, a medium-priority alarm is generated. When the delivered Vt is > 1.5 times the set upper Vt alarm limit, the Inspiratory volume limitation alarm is generated. In this case, the device aborts the breath and reduces the pressure to PEEP level. The device reduces the pressure for the next breath by 3 cmH2O
  - Apnea time = The maximum time allowed from the beginning of one inspiration to the beginning of the next inspiration. If the patient does not trigger a breath during this time:
    - A low-priority alarm sounds if Apnea backup is enabled. Apnea ventilation begins
    - A high-priority alarm sounds if Apnea backup is disabled

Indication:
Transcutaneous cardiac pacing uses external electricity to artificially impose cardiac depolarization. It is indicated in cases of unstable bradycardia (e.g. hypotension with AV block) or unstable tachycardia without organized activity (i.e. overdrive pacing for recurrent monomorphic ventricular tachycardia or Torsades de Pointes refractory to Magnesium). Remember that in the unstable tachycardic patient this is to be considered only after other pharmaceutical therapies have been implemented and failed. Cardiac pacing is unnecessary in conscious, hemodynamically stable patients with bradycardia.

Technique:

- Attach cardiac monitor chest electrodes to patient
  - Anterior pad at point of maximal impulse on left chest
  - Posterior pad directly posterior to anterior
  - See manufacturer recommendations
- Set pacer rate
  - Bradycardia: set pacer rate 20 - 30 beats per minute (bpm) **above** patient's intrinsic rate (ideally the rate should be between 60 - 70 bpm)
  - In unstable tachycardic patients without evidence of organized activity (e.g. in the cases of recurrent monomorphic ventricular tachycardia or Torsades de Pointes refractory to Magnesium): set pacer at rate higher than the patient's rate (this is done in an attempt to break the re-entry circuit and reset the SA node)
- Turn on pacer
- Set amperage (which activates the pacer)
  - In patients with decreased cardiac function (pulse and blood pressure present), turn on pacing element with amperage at lowest setting. Gradually increase until patient demonstrates electrical capture on ECG and mechanical capture as evidenced by pulses simultaneous with paced beat.
  - Electrical capture on an ECG or monitor will resemble a wide QRS complex (similar to a QRS complex in a left bundle branch block) after the electrical spike
  - When mechanical capture is obtained, adjust heart rate to maintain systolic BP > 100 mmHg. Any HR above 70 can severely overwork the myocardium.
- Ensure adequate analgesia.
  - *Fentanyl* (Sublimaze) 1 mcg/kg (max: 100 mcg) slow IV. May repeat after 10 minutes (max total dose: 200 mcg)
    - **OR** 100 mcg intranasal via MAD (divide dose equally between nostrils)
- Provide sedation if necessary
  - Note that the patient may still experience pain if sedated
  - *Midazolam* (Versed) 5 mg IM **OR** 5 mg intranasal via MAD **OR** 2.5 mg slow IV
  - Alternative**:** *Lorazepam* (Ativan) 2 mg IV **OR** 2 mg IM

Indication:

Defibrillation involves the delivery of non-synchronized direct electric current to the myocardium of a patient exhibiting ventricular fibrillation or ventricular tachycardia without palpable pulses. The depolarization of the entire myocardium may result in a pacemaker cell regaining control of electrical activity and producing adequate cardiac output.

Technique:

- When using an AED, defibrillation should be provided in accordance with the device prompts
- Pad placement should conform to manufacturer's standards; refer to package for specific instructions
- Generally, pads should be placed:
    - Anterior/posterior
    - **OR** right upper chest / left lower lateral chest
- **Make sure to "clear" any personnel prior to delivering energy**
- When using monophasic devices (rare), all attempts should be at 360 J.
- When using biphasic devices (e.g., LifePak 12/15):
    - **Initial attempt should be at 200 J**
    - All subsequent attempts should be at **escalating doses of energy**
- **PEDIATRIC**: Initial attempt should be at **2 J/kg**. All subsequent attempts should be at **4 J/kg**. Adult pads may be used on chest and back if necessary for children weighing more than 15 kg. If a patient is in refractory VF and has not responded to 2 doses of 4 J/kg, then the patient can be defibrillated at higher energy levels, not to exceed 10 J/kg or the adult maximum dose
- Patients with automatic implantable cardioverter-defibrillators (AICD) will still need external defibrillation if the device is ineffective
- If defibrillation is needed on a patient with a permanent implanted pacemaker, the defibrillator pads or electrodes should be placed at least 1 inch from the pulse generator of the pacemaker
- If conversion occurs and the patient requires additional defibrillation attempts, the patient should be defibrillated at the same joule setting of the last attempt

Universal Precautions

According to the Occupational Safety and Health Administration (OSHA), universal precautions are required methods of control to protect employees from exposure to all human blood and other potentially infectious material (OPIM). The term "universal precautions" refers to a concept of blood-borne disease control which requires that all human blood and OPIM be treated as if known to be infectious for HIV, HBV, HCV, or other blood-borne pathogens, regardless of the perceived "low-risk" status of a patient.

- In addition to any body fluid that is visibly contaminated with blood, the term "other potentially infectious material" is defined by OSHA as follows:
  - Semen or vaginal secretions
  - Cerebrospinal fluid
  - Synovial fluid
  - Pleural fluid
  - Pericardial fluid
  - Peritoneal fluid
  - Amniotic fluid
  - Saliva in dental procedures
  - Any unfixed tissue from a human, and HIV or HBV containing cells, tissue, or culture from a human or experimental animal

Body Substance Isolation (BSI) and Standard Precautions

The concepts of Body Substance Isolation (BSI) and Standard Precautions assume all body fluids and substances as infectious. These methods incorporate not only the fluids and materials covered by Universal Precautions, but expand coverage to include all body fluids, substances, and contaminated material. Standard precautions are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection.

Standard precautions includes the use of hand washing, appropriate personal protective equipment such as gloves, gowns, masks, whenever touching or exposure to patients' body fluids is anticipated. ***The CDC recommends Standard Precautions for the care of all patients, regardless of their diagnosis or presumed infection status.***

Transmission-Based Precautions

Transmission-Based Precautions (i.e., Airborne Precautions, Droplet Precautions, and Contact Precautions), are recommended to provide additional precautions beyond Standard Precautions to interrupt transmission of pathogens. Transmission-based precautions can be used for patients known or suspected to be infected with epidemiologically important pathogens that can be transmitted by airborne or droplet transmission or by contact with dry skin or contaminated surfaces. These precautions should be used in addition to standard precautions.

Airborne Precautions: Used for infections spread in small particles in the air such as chicken pox. This requires an N-95 mask or greater.

Droplet Precautions: Used for infections spread in large droplets by coughing, talking, or sneezing such as influenza.

Contact Precautions: Used for infections spread by skin-to-skin contact or contact with other surfaces such as herpes simplex virus.

Clinical syndromes or conditions warranting empiric precautions to prevent transmission of epidemiologically important pathogens pending confirmation of diagnosis:

Clinical Syndrome	Potential Pathogen	Empiric Precaution
Adult with diarrhea	**Clostridium difficile**	**Contact**
Fever and altered mental status	**Neisseria meningitidis**	**Droplet**
Generalized rash of unknown etiology	**Neisseria meningitidis** **Varicella** **Rubeola (measles)**	**Droplet, Airborne (N-95 mask), and Contact**
Cough, fever, hemoptysis	**Mycobacterium tuberculosis**	**Airborne (N-95 mask)**
Cough, fever in an HIV patient	**Mycobacterium tuberculosis**	**Airborne (N-95 mask)**
Skin abscess or draining wound	**Staphylococcus aureus**	**Contact**
History of drug-resistant infection	**MRSA, Vancomycin resistant enterococcus**	**Contact**

Indication:
This protocol allows for easy administration of medications which require ongoing infusion. The infusion pump is to be used only with certain medications (listed below) which have infusions indicated for use in the current medical care protocols.

Technique:

- Perform patient assessment and ensure patient placement on cardiac monitor
- Make sure to record vital signs every 5 minutes
- Prior to initiation of the infusion, verify the medication name, the concentration, the pump has enough medication for the expected transport time, and the appropriate infusion rate are what are noted in the protocol and indicated for the patient's condition
- Ensure the infusion tubing is properly connected to a three-way stopcock on the patient's intravenous line
- If an alarm is displayed during transport, the paramedic should attempt to correct the problem. If the problem is corrected, the alarm display message will disappear. If the problem cannot be remedied, the attendant should press the start / stop button to turn the infusion off
- Several error messages may appear during the infusion pump operation. Error conditions indicate the pump has detected a possible internal malfunction. If an error message appears, the attendant should turn the pump off and then on again. If the error message disappears when the pump is turned on again, ensure the medication is infusing at the prescribed rate. If the error message persists, the pump should be turned off. The possible internal error malfunction should be reported to on-duty captain at the end of transport
- Upon arrival at the receiving hospital, EMS personnel should confirm the volume infused during transport and any additional volume remaining. These volumes should be charted on the patient care report. Inform the receiving hospital of any problems encountered with the infusion, and how they were resolved. Document these problems and their resolution on the patient care report.

Notes:
If an IV infusion pump is not available, an infusion may be administered carefully by monitored drip rate in a "micro-drip" IV administration set.

Within your care report you shall document:

- The patient's presenting signs and symptoms, including vital signs
- Indications for use of infusion protocol
- Dosage and concentration of drug being delivered by infusion pump
- Patient assessment, including vital signs at regular intervals during transport. An acceptable interval for a patient with an infusion is every 5 minutes
- Volume (and dosage, if required) delivered during transport, and volume remaining in infusion pump
- Record of any alarms or error messages displayed by the infusion device during transport, with a description of corrective action to manage alarm or message
- Changes from baseline, if any, that occur during transport

Medication	Preparation	Dosing	Concentration	Program
Amiodarone	150mg in 60ml syringe of NS	1 mg/min (VF/VT)	150mg/3ml	Infuse 60ml over 150 min
Fentanyl	300 mcg in a 60 ml syringe of NS	1-4 mcg/kg/hr (sedation-analgesia after RSI)	100mcg/2ml	Enter the rate, concentration and estimated patient weight
Versed	5mg in a 60ml syringe of NS	0.02-0.1 mg/kg/hr (sedation-analgesia after RSI)	5mg/ml	Enter the rate, concentration and estimated patient weight
Diltiazem	120mg in a 60ml syringe of NS	5mg/min	125mg/25ml	Infuse 60ml over 24 minutes
Dopamine	400mg in 60ml syringe of NS	1-50 mcg/kg/min (shock) 1-3mcg/kg/min (CHF) 2-10mcg/kg/min (bradycardia)	800mg/500ml	Enter the rate, concentration and estimated patient weight
Lidocaine	40ml of (1gm/250ml conc lidocaine) in 60ml syringe filling the remainder with NS	2mg/min (VF/VT)	1gm/250ml	Infuse the 60ml over 80 minutes
Epinephrine (1:10,000)	Use the 1mg/10ml syringe	2-10mcg/min (last resort in bradycardia or shock)	1 mg/10ml	Infuse 10ml over 500-1000 minutes
Norepinephrine	Use 4mg (4mg/4ml vial) in 60ml syringe filling the remainder with NS	Adult: 1-30 mcg/min (start at 8 mcg/min) Peds: 0.1-1 mcg/kg/min (OLMD) (start at 0.1 mcg/kg/min)	4 mg/60 ml	Enter the rate, concentration

Preparation

1. Immediately protect the airway of a patient who is at risk for aspiration.
2. Have mechanical suction prepared and turned on
3. Oxygenate the patient while preparing for intubation
4. Have the patient connected to cardiac monitor and pulse oximetry
5. Have airway adjunct prepared in case of failed or difficult intubation
6. Prepare the patient and equipment in the same manner that is required of a standard endotracheal intubation. Refer to the Endotracheal Intubation protocol for details.

Technique

NOTE: The King Vision Display must be "OFF" before attaching a Blade; otherwise, the video image will become distorted. If this happens, simply turn the Display "OFF" then back "ON".

1. Preparing the King Vision Video Laryngoscope (the Display and the Blade combination) for use
   - Choose the style of Blade (Standard or Channeled) to be used.
   - Install the Display into the Blade (only goes together one way). Listen for a "click" to signify that they Display is fully engaged with the Blade. Note that the front and back of the parts are color-coded to facilitate proper orientation.

   Using the King Vision Channeled Blade: The size #3 (Adult) Channeled blade is designed to be used with standard ETT sizes 6.0 to 8.0. No stylet is needed.

   Lubricate the ETT, the guiding channel of the Channeled Blade and the distal tip of the Blade using a water soluble lubricant. Take care to avoid covering the imaging element of the blade with lubricant. The ETT may be preloaded into the guiding channel with its distal tip aligned with the end of the channel. Note that the ETT tip should not be evident on the screen when loaded properly. Alternatively, the ETT can be inserted into the channel after the blade has been inserted into the mouth and the vocal cords have been visualized.

   Using the King Vision Standard Blade: The size #3 (Adult) standard blade is used when integral guidance of the ETT is not indicated. In this case, a stylet will likely be necessary.

   Lubricate the distal tip of the Standard Blade using a water soluble lubricant. Take care to avoid covering the imaging element of the blade with lubricant. The ETT and stylet should be lubricated and the stylet pre-loaded into the ETT in the same manner as with other intubations where a stylet is used.

   User tip: Shaping the ETT with a pre-loaded stylet to match the blade curvature may be helpful.

2. Powering On
    - Press the POWER button on the back of the King Vision Display.
    - The King Vision Display should turn “ON” immediately AND Display shows a moving image.
    - Confirm the imaging of the King Vision is working properly.

    NOTE: If the LED Battery indicator light, in the upper left hand corner of the King Vision Display is FLASHING RED, the battery life remaining is limited and the batteries should be replaced as soon as possible.

3. Insertion of King Vision Blade into the Mouth
    - Open the patient’s mouth using standard technique.
    - In the presence of excessive secretions/blood, suction the patient’s airway prior to introducing the Blade into the mouth.
    - Insert the Blade into the mouth following the midline. Take care to avoid pushing the tongue towards the larynx.
    - As the Blade is advanced into the oropharynx, use an anterior approach toward the base of the tongue. Watch for the epiglottis and direct the Blade tip towards the vallecula to facilitate the visualization of the glottis on the Display’s video screen. The King Vision Blade tip can be placed in the vallecula like a Macintosh blade or can be used to lift the epiglottis like a Miller blade. For best results, center the vocal cords in the middle of the Display’s video screen.
    - If the lens becomes obstructed (e.g., blood/secretions), remove the Blade from the patient’s mouth and clear the lens.
    - Avoid putting pressure on the teeth with the King Vision Laryngoscope.

4. ETT Insertion
    - Advance the ETT (Channeled Blade) – After you can see the vocal cords in the center of the King Vision Display, advance the ETT slowly and watch for the cuff to pass through the vocal cords. Note that minor manipulation of the blade may be needed to align the ETT tip with the vocal cords.
    - Insert the ETT/Stylet (Standard Blade) – After you see the vocal cords on the King Vision Display, insert the Bougie or ETT with pre-loaded stylet into the mouth using a lateral approach. Once the Bougie or ETT tip has reached the posterior pharynx, manipulate the Bougie or ETT to direct its tip toward the vocal cords. Advance Bougie or ETT tip just through the cords then retract the stylet prior to advancing the ETT into position in the trachea with the cuff below the cords. Fully remove the stylet. If using a Bougie after seeing it pass through the vocal cords then slide the ETT over the Bougie and advance through the vocal cords.

5. Blade Removal

- Removing the King Vision Channeled Blade: Stabilize/hold the ETT laterally and remove the King Vision Video Laryngoscope from the mouth by rotating the handle toward the patient's chest. As the blade exits the mouth, the ETT should easily separate from the flexible lateral opening of the channel.
- Removing the King Vision Standard Blade: Stabilize/hold the ETT laterally and remove the King Vision Video Laryngoscope from the mouth by rotating the handle toward the patient's chest.
- Turn off the Display by pressing and holding the POWER button.

Note: ALWAYS confirm placement of the endotracheal tube even after visual intubation has been performed.

6. Separation and Disposal of the King Vision parts after use:
    - After the procedure is complete, separate the King Vision Display from the Blade. Dispose of the Blade following local protocol and clean/disinfect the Display.

NOTE: Do not dispose of the King Vision Display!

Pediatric Considerations

Use of the King Vision Video Laryngoscope in pediatric patients depends on the clinician's ability to perform proper intubation techniques with a size 3 blade. At this time, there are not pediatric specific sized blades.

Complications

1. The most common issue associated with ETT placement with any video laryngoscope is that the blade tip has been advanced too far; there may be a good close-up image of the vocal cords, but the ETT cannot be advanced because the blade/camera is obstructing ETT passage. To address this:
    - Place the Blade tip in the vallecula or,
    - If too close to the vocal cords, withdraw the Blade slightly and gently lift in an anterior direction prior to attempting to advance the ETT. tips:
2. Other
    - If the ETT tip is deflected off to the right due to the right aryepiglottic fold or arytenoid cartilage, twist the ETT counterclockwise 90 degrees to deflect left toward the laryngeal vestibule.
    - Center bevel of ETT to assist in entering the laryngeal vestibule. With the Channeled Blade, manipulate the handle to direct the ETT tip toward the laryngeal vestibule (usually toward the left), then return to midline to advance through the vocal cords.
    - With standard Blade, adjust the ETT/Stylet curve to match the Blade curvature. For a more anterior larynx, a sharper bend may be appropriate.
    - With the standard Blade, a retromolar approach with the ETT may facilitate intubation and may reduce the need to form the ETT/stylet with a sharper bend.

Cleaning and Disinfecting of the Reusable King Vision Display

Caution – Do not submerge the King Vision Display in any liquid as this can damage the Display. Do not reprocess or reuse any device suspected of being exposed to Creutzfeldt-Jakob Disease (CJD) or variants.

The King Vision Display is designed for easy cleaning and disinfection. The surfaces of the Display are specifically designed to allow proper cleaning without the need for any specialized equipment or supplies. The King Vision Display is intended to have minimal direct patient contact during normal use.

To prevent liquid from entering the King Vision Display, hold the device upright with the screen in front of you. Clean with enzymatic cleaning solution wiping with moistened gauze or wipes the King Vision Display for 2 minutes. Do not use dripping wet gauze or wipes. Use cotton swab to clean crevices around ON/OFF switch. You can remove the battery cover and clean the outer ledge on either side of the battery compartment with a cotton swab. Take care and avoid the batteries or the battery connects.

The LUCAS™ Chest Compression System is a mechanical chest compression device for patients over the age of 12 in cardiac arrest.

Indication:

- The device should only be used in patients **12 years or older** in **cardiac arrest**, where manual CPR would otherwise be used
    - **Avoid interruptions to chest compressions as a <u>top priority</u>**

Contraindication:

- The device should NOT be used in:
    - Patients who are awake, talking, or breathing normally.
    - Patients under age 12
    - Patients who do not fit the device properly:
        - Patents who do not fit within the device
        - Patients too large, for whom you cannot press the pressure pad down 2 inches
        - Patients too small, for whom you cannot pull the pressure pad down to touch the sternum
    - On-scene traumatic cardiac arrests (may use during transport)

Technique:

- Initiate interventions as outlined by the "Cardiac Arrest" Protocol
    - Manual CPR should be initiated immediately. Monitor should be applied immediately. **Both CPR and monitor must be initiated prior to LUCAS device** placement.
    - If the monitor demonstrates a shockable rhythm, clear all hands and body parts from the patient and **administer shock**. **Resume compressions immediately** once the shock is delivered.
    - **Minimize interruptions to chest compressions and limit to 10 seconds or less**
    - **<u>Do not delay manual CPR or monitor placement for LUCAS device placement</u>**. Continue until the device can be placed
- **Apply the backplate**
    - Center the backplate, with the top of the backplate located just below the patient's armpit.
    - The backplate can be placed by log-rolling the patient or raising the torso **during a scheduled pause of compressions** (e.g. after two minutes of uninterrupted compressions)
- **Position the compressor**
    - Turn the LUCAS device on (the device will perform a 3 second self-test)
    - Lift the LUCAS device using the handles on each side
    - Approach the patient on the opposite side of the provider performing chest compressions
    - Attach the claw hook to the backplate on the side opposite the provider performing chest compressions
    - Place the LUCAS device across the patient, between the arms of the provider performing compressions
    - The provider performing compressions may now stop compressions and assist securing the claw hook to the backplate on their side

- Pull up once to ensure the LUCAS device is securely attached

- **Adjust the height and position of the compression arm**
  - Use two fingers to ensure that the suction cup is immediately above the end of the sternum
    - If necessary, move the device by pulling the support legs to adjust the position
  - Press the Adjust Mode button to adjust the height of the compression arm
  - Manually push down the suction cup to the patient's chest, without compressing the chest. Pads and wires should not be under the suction cup.
  - Press the green Pause button to confirm placement
    - If position is incorrect, press the Adjust Mode button again and reposition
- **Patient adjuncts**
  - Place the neck roll behind the patient's head and attach the straps to the LUCAS device
  - Place the patient's arms in the straps provided
- **Start compressions**
  - **If the patient is not intubated**, push the **ACTIVE (30:2)** button to initiate compressions with a 30:2 compression to ventilation rate
  - **If the patient is intubated** with an iGel or endotracheal tube, push the **ACTIVE (continuous)** button
- **Rhythm and Pulse check**
  - After 2 minutes of continuous chest compressions, stop compressions for analysis by pushing the Pause button. Simultaneously:
    - Check for the presence of a pulse
    - Evaluate whether there is a shockable rhythm (and deliver shock if needed)
    - This process should take 10 seconds or less, and if no pulse is present, **resume CPR and repeat this cycle**.
  - If there is a shockable rhythm, defibrillation can and should be performed with the LUCAS device in place and in operation
  - Pads and wires should not be under the suction cup.
- **Disruption or malfunction**
  - If disruption or malfunction of the LUCAS device occurs, immediately restart manual CPR.

Care of the device:

- Power supply / battery
  - A fully charged battery should allow 45 minutes of uninterrupted operation
  - There is an extra battery in the LUCAS device bag
  - The battery is automatically charged when plugged into a wall outlet and not in operation
    - The device should be stored with the LUCAS device plugged into a wall outlet
  - When the battery LED shows an intermittent light, replace the battery or connect to a wall outlet
  - You may connect the LUCAS device to wall power in all operational modes, but the battery must be installed for the device to remain operational
- Care after use

- Remove the suction cup and stabilization strap. If used, remove patient straps
- Clean all surfaces and straps with an appropriate cleaning agent
- Let the device and parts dry
- Replace the used battery with a fully-charged battery
- Remount or replace the suction cup and straps
- Repack the device into the carrying bag
- Ensure that the charging cord is plugged into the LUCAS device

Intranasal Mucosal Atomization Device

Use caution in intranasal administration of drugs that can drop blood pressure (i.e. opioids) if intravenous access has not been established.

Using the LMA® MAD Nasal™ Intranasal Mucosal Atomization Device

LMA® MAD Nasal™ INTRANASAL MUCOSAL ATOMIZATION DEVICE

MATERIALS

TIPS TO IMPROVE SUCCESS

1. Minimize volume, maximize concentration
   - 1/3 mL per nostril is ideal, 1 mL is maximum
   - Use the appropriately concentrated drug
2. Maximize total mucosal absorptive surface area
   - Atomize the drug (rather than drip it in) to cover broad surface area
   - Use BOTH nostrils to double the absorptive surface area
   - Aim slightly up and outwards to cover the turbinates and olfactory mucosa
3. Beware of abnormal mucosal characteristics
   - Mucous, blood and vasoconstrictors reduce absorption
   - Suction nostrils or consider alternate drug delivery method in these situations

PROCEDURE

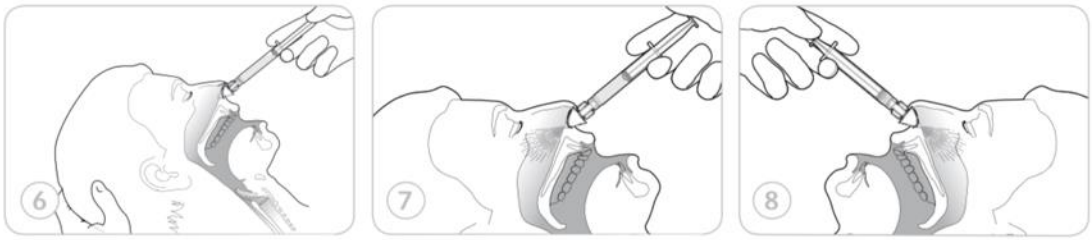
STEP 1: Remove and discard the green vial adapter cap.

STEP 2: Pierce the medication vial with the syringe vial adapter.

STEP 3: Aspirate the proper volume of medication required to treat the patient (an extra 0.1 mL of medication should be drawn up to account for the dead space in the device).

STEP 4: Remove (twist off) the syringe from the vial adapter.

STEP 5: Attach the MAD Nasal™ Device to the syringe via the luer lock connector.



STEP 6: Using the free hand to hold the occiput of the head stable, place the tip of the MAD Nasal™ Device snugly against the nostril aiming slightly up and outward (toward the top of the ear).

STEP 7: Briskly compress the syringe plunger to deliver half of the medication into the nostril.

STEP 8: Move the device over to the opposite nostril and, repeating steps 6 and 7, administer the remaining medication into the nostril if indicated.

Endotracheal Medication Administration

Indications:
In life-threatening emergencies when drug therapy is vital to patient survival and an IV line cannot be established. Dosage for medications administered via this route must be 2-2.5 times the IVP dose.

Equipment:

- Medication to be administered:
  - Narcan
  - Atropine
  - Epinephrine
  - Lidocaine
- Endotracheal tube with proper placement confirmed by capnography
- BVM or automatic ventilator

Technique:

- Dilute agent in 10 mL normal saline if > 8 years and up to 5 mL if < 8 years old
- If performing CPR, stop compressions momentarily
- Detach BVM, and inject medication directly into the endotracheal tube
- Immediately re-attach BVM to tube and ventilate with 5 breaths
- Resume CPR if patient is in cardiac arrest

Pacemaker Evaluation

Procedures

Indication:
Patients may present with a variety of implanted pacemaker types and settings. Most pacemakers are set to a demand mode (pacing only when needed to meet cardiovascular needs), but some pacemakers are fixed continuous pacing. Patients may carry a card indicating the brand and type of pacemaker implanted.

Technique:

- Correlate electrical pacing activity (seen on a 12 lead ECG) with heart activity (palpated pulses)
    - If pacer spikes seen on the ECG are not immediately followed by atrial, ventricular, or atrial and ventricular depolarization, the pacemaker may only be intermittently functioning
    - If the patient's heart rate is above 60 bpm, this may be normal, as some pacemakers are demand-only (pacing when needed)
    - Many pacemakers use an accelerometer to attempt to anticipate cardiovascular needs. Physical motion of the patient (e.g. jarring of the stretcher) may artificially stimulate pacing.
    - If the patient is bradycardic despite an implanted pacemaker, the pacemaker may be non-functional (e.g. dead battery), and no pacer spikes should be seen
- Pacemaker failure types include:
    - **Failure to pace** – no pacer spikes are seen, and the patient is often bradycardic
    - **Failure to sense** – patient's heart voltage may be too low for the pacemaker to sense, and the pacing becomes out-of-sync with native heartbeats
    - **Failure to capture** – pacemaker spikes are seen, but do not initiate heartbeats
    - **Runaway pacing** (overpacing) – the pacemaker initiates heartbeats at a very fast rate for unclear reasons, or artificially from excessive patient motion
- The above failure types can be evaluated using a 12 lead ECG and simultaneously palpating pulses
    - If the patient demonstrates unstable or severely symptomatic bradycardia (e.g. failure types 1 to 3 above), initiate "Cardiac Arrhythmias – Bradycardia" Protocol.
    - If the patient demonstrates unstable or severely symptomatic tachycardia (e.g. failure type 4 above), limit patient motion and refer to Cardiac Tachydysrhythmia Protocol.

Pacemaker Magnet Use:

- In cases where the patient is felt to be unstable as a consequence of runaway pacing (overpacing), a **donut-shaped medical magnet** may be placed over the pacemaker's electrical generator (a lump felt under the skin of the chest).
    - This sets the patient's pacemaker at a fixed rate, usually 60 bpm
    - This **should be reserved for emergencies** (unstable or severely symptomatic patients), as it can only be undone by a cardiologist with specialized pacemaker equipment.
- In cases of cardiac arrest, treat per usual per "Cardiac Arrest" Protocol, but do not place defibrillation pads directly over the pacemaker generator.

Indication:
Rapid sequence induction/intubation (RSI) involves pre-treatment with a sedative, followed by a paralytic agent, to facilitate proper advanced airway management. Examples include combativeness, head injury, respiratory distress, or trauma. Some unconscious patients may also be candidates for RSI intubation, at the discretion of the paramedic.

Technique:

Preparation:

- Monitor (continuous cardiac monitoring, SpO_2, $etCO_2$, BP) pre- and post-placement
- Check equipment:
  - Functional laryngoscope
  - BVM with high-flow O_2
  - ET tube(s), stylet, 10 mL syringe, securing device
  - Back up device: iGel
  - Advanced alternate airway bag IMMEDIATELY available
  - All medications labeled and drawn up
  - Suction charged and ready
  - ET tube confirmation equipment, waveform capnography, stethoscope
- Obtain vascular access (two lines preferred, but do not delay patient care)
- Assess for difficult airway ("**LEMON**" method)
  - **L**ook externally (facial trauma, large incisors, large tongue)
  - **E**valuate using the 3-3-2 rule:
    - Patient can open mouth ≥ **3 finger breadths**
    - Distance between chin and hyoid bone (angle of jaw) is ≥ **3 finger breadths**
    - Distance between hyoid and thyroid cartilage (above cricoid) is **≥ 2 finger breadths**
  - **M**allampati score
    - 1 = Visualize entire soft palate
    - 2 = Visualize uvula
    - 3 = Visualize base of uvula
    - 4 = Cannot visualize soft palate (tongue only)
  - **O**bstruction (anaphylaxis, foreign body, angioedema, etc.)
  - **N**eck mobility

Pre-treatment:

- Pre-oxygenate
- *Atropine* 0.02 mg/kg IV (min: 0.1 mg, max: 0.5 mg) for children < 5 years of age to prevent bradycardia
- *0.9% NaCl* bolus IV/IO to correct hypotension if no fluid overload and if time permits (dependent upon patient status)
  - Adults: 250 mL boluses IV (Max 2,000 mL)
  - Pediatrics: 20 mL/kg boluses IV/IO (Max 2 boluses)

- *Push dose Epinephrine* for persistent hypotension
  - How to make: 100mcg (1mL of 1:10,000 cardiac epinephrine concentration) drawn up with 9mL of saline in flush. This makes a 10mcg/mL dose push syringe (refer to Quick Reference Guide)
  - Adults: 10-20 mcg (1-2 mL) IV/IO q3-5 minutes for persistent systolic blood pressure < 90 mmHg (Max 2 doses)
  - Pediatrics: Administer 1mcg/kg (0.1 mL/kg) IV/IO q3-5 minutes for persistent systolic blood pressure less than lower limit of normal for patient's age (refer to normal pediatric vital signs chart) (Max 2 doses)
    - Maximum single dose 10 mcg (1 mL)
- Consider Sellick maneuver (gentle cricoid pressure until tube placement is confirmed)

Induction:

- **Sedation** BEFORE paralytic. Options include (choose one):
  - *Etomidate* 0.3 mg/kg IV for conscious patients (short-acting sedative)
  - *Midazolam* (Versed) 0.1 mg/kg slow IV (Max single dose: 5 mg)
  - *Ketamine* 1 – 2 mg/kg IV (Max single dose: 200 mg)
- **Paralytic** after sedation has taken effect. Options include (choose one):
  - *Succinylcholine* 1 – 1.5 mg/kg IV (short-acting paralytic)
    - Contraindications: burns >24 hours, hypersensitivity, neuromuscular disorders, malignant hyperthermia, concern for hyperkalemia, crush injury, penetrating eye injury
  - *Rocuronium* 1 mg/kg IV (long-acting paralytic)
    - **Must continuously monitor for signs of under-sedation (tachycardia, hypertension, tachypnea, tearing, rising EtCO2)**
- **Intubation** after loss of muscle tone:
  - Alternative airways (e.g., iGel) are acceptable
- **Verify** endotracheal (ET) tube placement with three methods - one **must be $etCO_2$**!
  - **$etCO_2$** (*required*)!
  - Direct visualization of the ET tube passing through the vocal cords into the trachea
  - Auscultation of bilateral breath sounds and absence of sounds over the epigastrium
  - Visualization of thoracic movement with ventilation
  - Fogging in the ET tube
- **Secure** ET tube

Post intubation management:

- Consider starting continuous infusion of either Midazolam or Fentanyl immediately post-intubation:
  - *Midazolam* (Versed) 0.02 – 0.1 mg/kg/hr IV infusion
  - *Fentanyl* 1 – 2 mcg/kg/hr IV infusion
    - If severe post-intubation agitation persists despite 2 mcg/kg/hr, may increase up to 4 mcg/kg/hr
  - Select the lowest dose that allows adequate sedation
  - Titrate down when possible

- Reduce the dose if hypotension occurs

- Alternatively, may administer a bolus of one of the following:
  - *Midazolam* (Versed) 0.05-0.1 mg/kg slow IV (Max single dose: 5 mg)
    - May repeat once after 5 minutes if needed
    - If continued sedation needed, start IV infusion of either Midazolam or Fentanyl
  - *Ketamine* 1-2 mg/kg slow IV (Max single dose: 200 mg)
    - May repeat once after 5 minutes if needed
    - If continued sedation needed, start IV infusion of either Midazolam or Fentanyl
- For pain, you may administer:
  - *Fentanyl* 50 – 100 mcg IV. May repeat every 5 minutes as needed; Max cumulative dose: 200 mcg
    - (Peds dosing: 1 mcg/kg IV (Max single dose: 50 mcg). May repeat every 5 minutes as needed; Max cumulative dose: 100 mcg)
- May re-administer a paralytic once when a severely agitated patient is at risk of losing airway after sedation and pain control have failed. A sedative MUST be given prior to paralytic re-administration.
  - *Succinylcholine* 1 – 1.5 mg/kg IV (short-acting paralytic)
  - *Rocuronium* 1 mg/kg IV (long-acting paralytic)

Notes:

- Resuscitate before you intubate (i.e. correct vital signs abnormalities including hypotension)
- At any time an etCO_2 waveform is lost, the endotracheal tube **must be removed** and the patient ventilated and oxygenated with a bag-valve-mask (BVM)
- Use gentle laryngeal pressure (i.e., Sellick's) during intubation and pre-oxygenation to minimize aspiration
- Extra care must be given to protect the patient's neck, since any muscle tone protecting an injury will have been lost from the paralytic
- It is paramount that the airway is maintained, especially after sedation / paralysis
- Do not delay oxygen administration or ventilation for any reason
- If patient becomes tachycardic or hypertensive, consider the need for further sedation
- Consider placing a C-collar or Posey restraints on the patient
- Once paralyzed, it is entirely up to the rescuer to provide breaths for the patient

Complications:

- If the patient has complications related to airway management, perform the "**DOPES**" mnemonic:
  - **D**islodgement
    - Tube may be accidentally removed, or may be too deep (right mainstem intubation)
    - Remove endotracheal tube, or immediately reposition to assure ventilation / oxygenation
  - **O**bstruction
    - Suction endotracheal tube for debris
    - If unsuccessful, may require removal and reintubation
  - **P**neumothorax
    - Refer to "Needle Decompression" Protocol

        - Pneumothorax is a contraindication to mechanical ventilation (avoid transport ventilator)
    - **E**quipment failure
        - Rapidly evaluate monitor and transport ventilator
    - **S**tacked breaths
        - Inhaled air without adequate time to exhale, “breath stacking”
        - Remove Ambu bag, open endotracheal tube to air, allow trapped air to exhale, repeat vital signs
- When in doubt, remove the endotracheal tube and ventilate with bag-valve-mask.

Combat Application Tourniquet®

Instructions for Use: Two-handed Application

To prepare for use, store the C-A-T® in its one-handed configuration

1

Apply tourniquet proximal to the bleeding site. Route the band around the limb and pass the tip through the inside slit of the buckle. Pull the band tight.

2

Pass the tip through the outside slit of the buckle. The friction buckle will lock the band in place.

3

Pull the band very tight and securely fasten the band back on itself.

4

Twist the rod **until bright red bleeding has stopped and the distal pulse is eliminated.**

5

Place the rod inside the clip; locking it in place. **Check for bleeding and distal pulse.** If bleeding is not controlled, consider additional tightening or applying a second tourniquet proximal side by side to the first and reassess.

6

Secure the rod inside the clip with the strap. **Prepare the patient for transport and reassess.** Record the time of application.

QuikClot® Hemostatic Dressing

QuikClot® Hemostatic Dressing Instructions for Use

1. Open package and remove QuikClot Dressing. Keep the empty package.

2. Place QuikClot Dressing over the wound and use it to apply pressure directly over bleeding source. (more than one dressing may be required.)

3. Continue to apply pressure for 3 minutes or until bleeding stops.

4. Wrap and tie bandage to maintain pressure. Seek medical care immediately. Show product removal directions on package to medical personnel.

Emergency Bandage (formerly known as "Israeli Bandage")

1 Place pad on wound & wrap the elastic bandage around limb or body part

2 Insert elastic bandage into pressure bar

3 Tighten elastic bandage

4 Pull back – forcing pressure bar down onto pad

5 Wrap elastic bandage tightly over pressure bar and wrap over all edges of pad

6 Secure hooking ends of closure bar into elastic bandage

Needle Decompression for Suspected Tension Pneumothorax

A tension pneumothorax is a medical emergency wherein a one-way valve causes an abnormal collection of gas in the pleural space of the chest, compromising breathing and blood flow to the heart, and leading to progressive cardiopulmonary collapse. Signs and symptoms may include decreased breath sounds, tachycardia, shortness of breath, low SpO_2, **hypotension**, jugular venous distension, deviated trachea, and PEA arrest. Typically, tension pneumothorax is associated with blunt or penetrating trauma. Patients with underlying disease like COPD or cystic fibrosis may be predisposed to a primary (spontaneous) pneumothorax.

Indications:

1. ***Suspected Tension Pneumothorax*** in patients exhibiting at least 3 of the following criteria:
   - 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)
2. ***Cardiac Arrest after blunt or penetrating trauma*** involving the chest or abdomen
   - Unless the injury is clearly unilateral, consider bilateral pleural decompression in patients who suffer cardiac arrest in this scenario

Equipment:

- 14 gauge 2 – 2.5 inch catheter over the needle (Adult) OR 16 – 18 gauge catheter (Pediatrics)
- Tape
- Sterile gauze pads
- Antiseptic swabs
- Occlusive dressing

Technique:

- Locate decompression site
  - Identify the 2nd intercostal space in the mid-clavicular line on the same side as the suspected tension pneumothorax **(strongly preferred)**
  - 4th intercostal space on affected side in midaxillary line
- Prepare skin at the puncture site with an antiseptic swab
- Insert appropriate gauge catheter perpendicular to the skin and over the inferior rib
- Insert the catheter into the thorax until air exits. Remove any parts from the catheter/needle assembly which may occlude the lumen
- Listen for a rush of air. If noted, the diagnosis of pneumothorax and proper needle placement is confirmed
- **Leave the catheter in the patient**
- Secure the catheter taking care not to allow it to kink
- Reassess lung sounds and patient condition frequently

- Assess breath sounds and respiratory status frequently
- If air collection reaccumulates (tension pneumothorax develops again), may repeat decompression as needed with a second catheter
    - Noted by reoccurrence of instability (hypotension, tachycardia, hypoxia) along with decreased breath sounds on the affected side and jugular venous distention

Spinal Immobilization for Football Players

EMS providers must use extreme caution when evaluating and treating an injured football player, especially when the extent of the injury remains unknown. Suspect spinal injury in any football player who has altered mental status or any other neurologic complaint. If the football player isn't breathing effectively, work quickly and effectively with the athletic trainer staff to remove the face mask and administer care. ***In most situations, the helmet and shoulder pads should not be removed in the field***. Manage head and neck injuries with the helmet and shoulder pads in place, removing only the face mask from the helmet.

Football Face Mask Removal:

- The face mask should be removed prior to transportation, regardless of current respiratory status
- Those involved in the prehospital 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 Technique:

- If it becomes absolutely necessary to remove the helmet, spinal immobilization must be maintained while removing the helmet
- 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
- 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. This may result in hyperextension of the neck; support underneath the occiput may be required to maintain anatomic alignment.
- The front of the shoulder pads can be opened to allow access for CPR and defibrillation

Note: Do not access dialysis fistulas or infusion ports for IV access unless the patient is in an immediate, critical, and imminently life-threating condition (e.g. cardiac arrest). Use of an atomizer device or placement of an IO is preferred over the use of dialysis fistulas or infusion ports for IV access. Our concern with the use of these sites is contamination, bleeding, or accidental dislodgement could occur.

External Jugular IV line Placement

Indications:

- Patients requiring IV medications or fluids when a peripheral line cannot be established
    - In cardiac arrest scenarios, attempt intraosseous access first to avoid interference with resuscitation efforts

Contraindications:

- Child with partial airway obstruction (e.g. suspected epiglottitis) – when agitation from performing procedure may worsen respiratory difficulty
- Do not insert IV through site of infection

Equipment:

- Appropriate tubing or IV lock
- 14 ga – 24 ga catheter over the needle
- Antiseptic swab
- Gauze pad or adhesive bandage
- Tape or other securing device

Technique:

- Assemble IV solution and tubing
- Verify correct IV solution and check for clarity and expiration date
- Identify the external jugular vein on the lateral aspect of the neck
    - Turn the patient's head slightly to the side opposite the insertion site
    - Slight Trendelenburg position may help accentuate the vein
    - Apply light pressure above the clavicle to engorge the external jugular vein
- Clean the skin with the antiseptic swab
- Select a site for puncture, preferably as far away as possible from the clavicle in order to avoid accidental lung puncture
- Once a flash is obtained, advance the catheter over the needle, and remove the needle while compressing the proximal tip of the catheter to minimize blood loss
- Connect IV tubing to the catheter, or secure the IV lock to the catheter, and flush with appropriate solution (normal saline)
- Check the IV insertion site occasionally for swelling which may indicate extravasation or loss of patency

- If IV attempt is unsuccessful, cover with gauze and tape and apply pressure as needed to stop bleeding

Intraosseous Access using the EZ-IO®

Indications:

- When vascular access is essential in the management of a severely ill adult or child, and no other option is readily available
- Provides alternative vascular access, which can be considered for patients who require fluids or medications when IV access is unattainable in 2 attempts or 90 seconds AND the patient exhibits 1 or more of the following:
    - Adult:
        - Altered mental status (GCS ≤ 8)
        - Respiratory compromise (SpO_2 < 90%) after appropriate oxygen therapy
        - Hemodynamic instability
        - Cardiac arrest
        - Profound hypovolemia with altered mental status
    - Pediatric:
        - Unconscious or unresponsive
- IO may be considered PRIOR to peripheral IV attempts in the following situations:
    - Pediatric
    - Cardiac arrest
    - Patient is seriously ill or injured

Contraindications:

- Fracture of the bone being considered for potential intraosseous access
- Infection over the insertion site
- Previous orthopaedic procedures at the site
- Infants less than 3 kg
- Inability to locate landmarks (excessive tissue, significant edema)
- Relatively contraindicated if other adequate vascular access is readily available

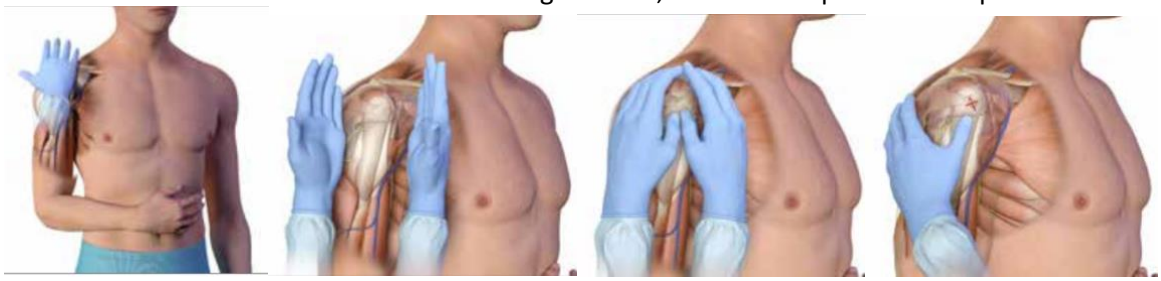
Technique – Tibial Insertion:

- Identify and palpate the tibial tuberosity just below the knee
- Locate a consistent flat area of bone 2 cm distal and slightly medial to the tibial tuberosity
- Support the flexed knee by placing a hand or towel under the calf
- Cleanse the area with a sterilizing solution and perform insertion using aseptic technique
- Using the EZ-IO® drill insertion device, place the needle tip at the selected insertion site. Keep the needle perpendicular to the skin, and gently pierce skin until the needle touches bone. Ensure at least one black line is visible on the needle (if not, select larger needle size)

  - In pediatric patients who are less than 1 year of age, a pink IO needle can be placed manually (do **NOT** use IO drill)
- Squeeze the trigger while maintaining gentle, steady pressure on the handle
- Release the trigger when you feel a decrease in resistance (hub may be flush with skin)
  - If properly placed, the needle should stand up from the bone without assistance
- Remove the inner trocar and use a syringe to aspirate bone marrow
  - Obtaining marrow confirms placement
- Flush with 40 mg lidocaine for anesthesia (0.5 mg/kg in pediatrics)
- If marrow does not return when aspirated, flush with 5-10 mL of Normal Saline
  - Significant resistance or extravasation suggests improper placement
  - If flow is good, and no extravasation is seen, attach IV tubing and secure in place

Technique – Humeral Head Insertion:

- Position the humerus by rotating the humerus internally by either of the following two ways:
  - Place patient's hand over the umbilicus with arm tight to the body; or:
  - Place the arm tight against the body, rotate the hand so the palm is facing outward, thumb pointing down
- Identify humeral head insertion site
  - Place your palm on patient's shoulder anteriorly and identify area that feels like a "ball"
  - Place one of your hands vertically over the axilla, and the other hand vertically along the midline of the upper arm laterally
  - Place your thumbs together over the arm and deeply palpate the surgical neck which will feel like a "golf ball on a tee" (surgical neck is the spot where the "ball" meets the "tee")
  - The insertion site is 1-2 cm above the surgical neck, on the most prominent aspect for most adults



- Cleanse the area with a sterilizing solution and perform insertion using aseptic technique
- Using the EZ-IO® drill insertion device, place the needle tip at the selected insertion site. Keep the needle perpendicular to the skin, and gently pierce skin until the needle touches bone. Ensure at least one black line is visible on the needle (if not, select larger needle size)
  - In pediatric patients who are less than 1 year of age, a pink IO needle can be placed manually (do **NOT** use IO drill)
- Squeeze the trigger while maintaining gentle, steady pressure on the handle
- Release the trigger when you feel a decrease in resistance (hub may be flush with skin)
  - If properly placed, the needle should stand up from the bone without assistance
- Remove the inner trocar and use a syringe to aspirate bone marrow

- Obtaining marrow confirms placement
- Flush with 40 mg lidocaine for anesthesia (0.5 mg/kg in pediatrics)
- If marrow does not return when aspirated, flush with 5-10 mL of Normal Saline
  - Significant resistance or extravasation suggests improper placement
- If flow is good, and no extravasation is seen, attach IV tubing and secure in place

Complications:

- Extravasation of fluid or caustic medications
- Pain, fracture, hematoma, growth plate injury
- Compartment syndrome
- Osteomyelitis
- Cellulitis at the insertion site

Peripheral IV line Placement

Indications:

- Patients requiring IV medications or fluids
- Patients with any potential for deterioration (e.g. seizures, altered mentation, trauma, chest pain, difficulty breathing)
- Use large-bore IVs when there are concerns for hemodynamic instability, especially if you suspect patient may need volume resuscitation. A second IV may be advisable (e.g. trauma patient, patient with possible ruptured AAA).

Contraindications:

- Child with partial airway obstruction (e.g. suspected epiglottitis) – when agitation from performing procedure may worsen respiratory difficulty
- Do not insert IV through site of infection

Equipment

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

Technique:

- Assemble IV solution and tubing
- Verify correct IV solution and check for clarity and expiration date

- Place the tourniquet around the patient's arm proximal to the IV site
- Identify the most appropriate venous puncture site
- Clean the skin with the antiseptic swab in an increasing sized concentric circle
- Stabilize the vein distally (with your non-dominant hand) and enter the skin with the bevel of the needle facing upward, angled from 10-30°
- Once a flash is obtained, advance 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)
- Check the IV insertion site occasionally for swelling which may indicate extravasation or loss of patency
- If IV attempt is unsuccessful, cover with gauze and tape and apply pressure as needed to stop bleeding

Ultrasound- Guided Peripheral IV line Placement

Ultrasound machines emit a high frequency of sound waves outside the range of human hearing. The emitted sound waves interact with tissues in the human body and reflect or "echo" back to the ultrasound probe, producing an image on the screen. Sound waves travel less efficiently through hollow or fluid-filled structures, producing an anechoic (without echo) image which appears black. Sound waves travel more efficiently through dense or solid structures, producing an echoic (echoes well) image which appears white. Ultrasound can be used as an adjunct to standard peripheral IV access to assist with visualizing veins to obtain vascular access.

Indications:

- Numerous failed attempts (>2 attempts)
- Patients requiring IV medications or fluids
- Patients with any potential for deterioration (e.g. seizures, altered mentation, trauma, chest pain, difficulty breathing)

Contraindications:

- Do not use when **emergent** vascular access is needed (proceed to standard peripheral IV access or intraosseous access)
- Do not use to obtain EJ access
- Child with partial airway obstruction (e.g. suspected epiglottitis) – when agitation from performing procedure may worsen respiratory difficulty
- Do not insert IV through site of infection

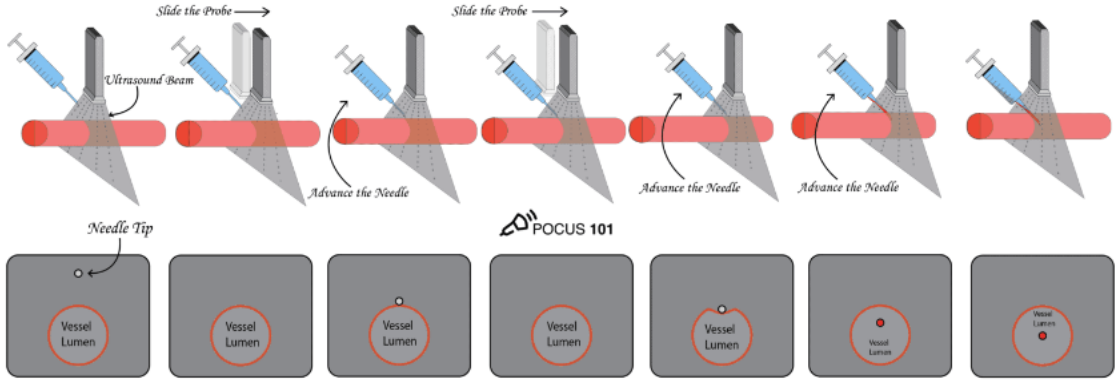
Equipment

- Butterfly iQ+ Ultrasound probe
- iPad with Butterfly iQ+ app
- Sterile Ultrasound gel

- Appropriate tubing or IV lock
- Venous tourniquet
- Long 18 ga – 20 ga catheter over the needle (longer than standard needles)
- Antiseptic swab
- Gauze pad or adhesive bandage
- Tape or other securing device

Technique:

- Assemble IV solution and tubing
- Verify correct IV solution and check for clarity and expiration date
- Open Butterfly iQ+ app on iPad and set preset to Vascular Access
- Clean the skin with the antiseptic swabs
- Apply sterile ultrasound gel to the probe
- Hold probe using "C" grip, resting butt of hand against patient arm to stabilize probe
- Place probe perpendicular to skin with probe marker ("Dot") facing toward the left, and center the probe on the vessel (midline marker on probe should be on center of vessel)
- Begin scanning by starting at the antecubital area, scanning up and down the arm to identify an appropriate vein within a depth of 0.5 cm to 1.25 cm
- Adjust Depth and Gain settings to maximize the image of the vein on iPad screen
- Confirm that the vessel is a vein by compressing it and visualizing the vein collapse as well as noting the absence of pulsations as would be seen with an artery
- Place the tourniquet around the patient's arm proximal to the IV site
- Enter the skin 2-3 mm away from the probe with the bevel of the needle facing upward, angled at 45° until the needle tip is visualized on the screen
- Using the "Leading the Needle" technique, only advance needle after needle tip is visualized at every step of the way:
    - Visualize needle tip
    - Slide probe slightly until needle tip disappears from view
    - Advance needle further until needle tip is re-visualized
    - Repeat sliding probe and advancing needle until you visualize the needle tip tenting the vessel wall
    - Advance the needle tip into the vessel lumen and confirm flash in the needle
- Advance the needle until the tip is centered in the vessel lumen



- Lower the angle of the needle to 20°, and advance the catheter over the needle
- 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)
- Check the IV insertion site occasionally for swelling which may indicate extravasation or loss of patency
  If IV attempt is unsuccessful, cover with gauze and tape and apply pressure as needed to stop bleeding

Notes:

- Blood vessels should appear black (anechoic)
- The angle of insertion for ultrasound-guided access is steeper than for standard access
- This does not take replace of IO access when immediate vascular access is needed
- Chances of success are higher by selecting larger diameter and more superficial vessels
- When advancing the needle, keep your eyes on the screen, not on the insertion area
- Thoroughly clean probe after each use

Indwelling Intravenous Access

- Permanent access ports: PICC, Groshong, Hickman, Broviac, or central lines
- Access only in life threatening conditions after all other access attempts have been exhausted
- Clean port with 10 twists of an alcohol prep and then allow to dry
- Remember to keep all ports capped when not in use
- ALWAYS aspirate 10 mL of fluid from permanent lines and waste this product
- Flush with Saline (10 mL)
- Administer therapy
- Start a KVO rate infusion
- Alert hospital staff that you accessed this access point and why
- Document reason for this use

Background:
Ventilation for patients who have undergone endotracheal tube, iGel, or advanced airway device intubation can be provided through a mechanical ventilator. These devices generally deliver air to the patient at a fixed volume or pressure. Our ventilator operates in a mode called **Assist Control** that delivers air at a volume set by the operator.

Indication:

- Adult patients who have undergone endotracheal, iGel, or other advanced airway device intubation requiring ongoing ventilatory assistance

Contraindication:

- Pediatric patients (age < 18)
- Pneumothorax or suspected pneumothorax (even if status post needle decompression)
- Pulmonary over-pressurization (water ascent injury, blast injury, etc.)
- Poor lung compliance or high resistance

Technique:

- Place the patient on continuous monitoring (cardiac monitoring, SpO_2, $etCO_2$, BP)
- Verify tube placement as per "Airway Procedures" and "Rapid Sequence Induction" Protocols
- Check automated transport ventilator (**ATV**) and follow manufacturer's instructions for the device
- Check that all tubing is intact and free from kinks
- Set ventilator settings (including Tidal volume, Respiratory rate, FiO_2, and PEEP) as described below:
    - **Tidal Volume**
        - Select the appropriate tidal volume for the patient based on the following formula:
            - **6 to 8 mL/kg of ideal body weight (IBW)**
        - Tidal volume is based on **ideal body weight**, based on height, regardless of actual patient weight!
        - Ideal body weight is calculated by the following:
            - IBW = **50 kg + (2 kilograms per every inch over 5 feet)**
        - Select an appropriate tidal volume based on these formulas or the chart below:

Tidal Volume (mL)		
Height in feet / inches	6 mL/kg IBW	8 mL/kg IBW
5'0"	300	400
5'1"	312	416
5'2"	324	432
5'3"	336	448
5'4"	348	464
5'5"	360	480
5'6"	372	496

5'7"	384	512
5'8"	396	528
5'9"	408	544
5'10"	420	560
5'11"	432	576
6'0"	444	592
6'1"	456	608
6'2"	468	624
6'3"	480	640
6'4"	492	656

- The tidal volume should **be set and remain between 6 and 8 mL/kg IBW** throughout transport!
- This low tidal volume strategy helps prevent lung injury and Acute Respiratory Distress Syndrome (ARDS)
- Tidal volume is **not** changed to address issues of ventilation or oxygenation

- **Respiratory Rate**
  - The set respiratory rate is a **minimum rate**; the patient may breathe more than this on their own
  - **If the patient was intubated for COPD or asthma,** or an obstructive lung condition:
    - Set the initial respiratory rate at **10**
    - **Titrate up** to the lowest respiratory rate that provides appropriate oxygenation on pulse oximetry (SpO_2), typically 90 to 100%
    - The goal is to allow the patient **time to exhale** in this obstructive state
    - $etCO_2$ may be high in this specific group
    - Patients not provided time to exhale can develop air trapping in their lungs, which can lead to increased pressure, pneumothorax, abnormal vital signs, or circulatory collapse
  - **For all other intubated patients**:
    - Set the initial respiratory rate to **16**
    - **Titrate up** (or down) **as needed to address ventilation**.
      - Target this respiratory rate to an appropriate $etCO_2$ reading (usually 35-45), indicating appropriate ventilation
  - If spontaneous breathing is noted, patients may experience greater comfort with a lower Respiratory Rate setting
- **FiO_2** (Fraction of Inspired Oxygen)
  - This is the percentage of air delivered that is oxygen
  - **Start at 100% oxygen** for 5 minutes
    - This protects against any remaining hypoxia
  - **Titrate down** to an appropriate oxygenation level on pulse oximeter (**90-99% is ideal**)
  - If there are any concerns about inaccurate pulse oximetry, leave at 100% FiO_2
- **PEEP** (Positive End-Expiratory Pressure)

- This is the pressure remaining in the lungs at the end of exhalation
- Facilitates work of breathing and opening lung air spaces that may be closed
- **Start at 5** and **titrate up as needed** to achieve appropriate oxygenation on pulse oximeter

- Assess the patient's ventilation on the automated transport ventilator and listen for lung sounds
  - If the chest appears to over-expand, reduce tidal volume
- Assess and manage the airway as you would for any patient undergoing assisted ventilation

Troubleshooting:

- Most causes of sudden, precipitous collapse on mechanical ventilators are from **"air trapping"** / **"stacked breaths"** – more air was forced in by the ventilator than the patient was able to exhale
  - If **any concern** for air trapping / breath stacking is present, **disconnect the endotracheal tube from the ventilator**, open the tube to air, and allow trapped air to exhale.
  - This may take up to 60 seconds in some patients
  - Once exhaled, recheck vital signs and reassess why air trapping might have been taking place.
    - Common causes include respiratory rate too high or tidal volume too high
    - Consider reducing respiratory rate, or reducing tidal volume to 6 mL/kg IBW
  - For other complications related to ventilator management, consider the "**DOPES**" mnemonic:
    - **D**islodgement
      - Tube may be accidentally removed, or may be too deep (right mainstem intubation)
      - Remove endotracheal tube, or immediately reposition to assure ventilation / oxygenation
    - **O**bstruction
      - Suction endotracheal tube for debris
      - If unsuccessful, may require removal and reintubation
    - **P**neumothorax
      - Refer to "Needle Decompression" Protocol
      - Pneumothorax is a contraindication to mechanical ventilation (avoid transport ventilator)
    - **E**quipment failure
      - Rapidly evaluate monitor and transport ventilator
    - **S**tacked breaths
      - Inhaled air without adequate time to exhale, "breath stacking"
      - Remove Ambu bag, open endotracheal tube to air, allow trapped air to exhale, repeat vital signs
  - If any concerns about the patient's stability on the ventilator, **disconnect the ventilator and perform ventilation through an Ambu bag**
  - If concerns remain, remove the endotracheal tube or advanced airway device and perform bag-valve-mask ventilation

Notes:

- Mechanical ventilators do not adapt to changing patient situations well and require vigilance by the operator
- Continue to treat the underlying condition for which the patient was intubated!
    - Particularly in COPD or asthma, therapies such as *Albuterol* should be continued
- Large tidal volumes cause ARDS and lung injury. Select an appropriate 6 to 8 mL/kg IBW tidal volume.
- Have a high level of suspicion and alertness for breath stacking / air trapping on any patient on a ventilator

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

Contraindications:
1. Patent airway without additional suctioning assistance.
2. Amniotic fluid or meconium in naso/oropharynx of vigorous, non-dyspneic neonate.

Technique:
1. Open airway and inspect for visible foreign material.
2. Remove large or obvious foreign particulates with Magill forceps or gloved hands. Sweep finger ACROSS posterior pharynx and clear material out of mouth.
3. Power on suction machine.
4. Suction of oropharynx:
    a. Attach suction tip (or use open end of suction tubing for large amounts of debris).
    b. Oxygenate and ventilate the patient prior to the procedure as needed.
    c. Insert tip into oropharynx under direct visualization, with sweeping motion.
    d. Continue intermittent suction interspersed with active oxygenation by mask. Use positive pressure ventilation as needed.
    e. If suction becomes clogged, dilute by suctioning water or normal saline to clean tubing. If suction clogs repeatedly, use connecting tubing alone, or manually remove large debris.

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

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

2. Use equipment large enough for the job at hand. Large, solid matter will not be cleared out with Yankauer suckers. Large amounts of particulate matter require open-ended suction using connecting tubing, Magill forceps, and/or physical removal with a gloved hand (using bite precautions).
3. The catheter and tubing will require frequent rinsing with water or normal saline to permit continued suctioning. Have a container of water or normal saline at hand before you begin. Use gauze to remove large material from the end of the catheter.
4. Do not insert a suction catheter with the suction functioning. Suction only on withdrawal of the catheter.

Complications:

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

MEDICATION GUIDELINES

The following pages contain guidelines for the medications encountered by Levy County Department of Public Safety paramedics. The list refers to the medications carried on all ALS units. They identify the name and class of the drug, a short description, indications, contraindications, and precautions. This is only a guideline to medication administration and shall not circumvent the need to refer to the appropriate Protocol or to contact OLMD for orders and consultation. For detailed and extensive information on each drug, refer to the Advanced Cardiac Life Support text or an emergency pre-hospital pharmacology reference.

A chart for Pregnancy Categories is available after this page for reference.

Refer to the appropriate Protocol or contact OLMD for specific dosage information.

Medication List:

- Adenosine (Adenocard)
- Albuterol sulfate (Proventolin; ProAir)*
- Amiodarone*
- Aspirin
- Atropine sulfate*
- Calcium chloride
- Cefazolin (Ancef)
- Dextrose 50%*
- Diphenhydramine
- Diltiazem (Cardizem)
- Epinephrine (1:1000)*
- Epinephrine (1:10,000)*
- Etomidate
- Fentanyl
- Glucagon
- Glucose (oral)
- Haloperidol (Haldol)
- Ipratropium (Atrovent)
- Ketamine
- Labetalol
- Lidocaine 2%
- Lorazepam (Ativan)*
- Magnesium sulfate
- Methylprednisolone (Solumedrol)
- Midazolam (Versed)
- NaCl 0.9%
- Naloxone (Narcan)*
- Norepinephrine (Levophed)
- Nitroglycerin*
- Ondansetron (Zofran)
- Oxygen
- Sodium bicarbonate
- Sodium chloride
- Succinylcholine
- Tetracaine
- Tranexamic Acid

***** denotes medications required by Florida EMS Rule 64J

Pregnancy Category Definitions

The FDA has established five categories to indicate the potential of a drug to cause birth defects if used during pregnancy. The categories are determined by the reliability of documentation and the risk:benefit ratio. They do *not* take into account any risks from pharmaceutical agents or their metabolites in breast milk. The pregnancy categories are as follows:

Category A
Adequate and well-controlled studies have failed to demonstrate a risk to the fetus in the first trimester of pregnancy, and there is no evidence of risk in later trimesters.
Example: Magnesium sulfate

Category B
Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.
Example: Glucagon, Ipratropium, Ketamine, Naloxone, Ondansetron

Category C
Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.
Example: Adenosine, Albuterol, Amiodarone, Atropine, Calcium Chloride, Diltiazem, D50

Category D
There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.
Example: Midazolam

Category X
Studies in animals or humans have demonstrated fetal abnormalities and/or there is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience, and the risks involved in the use of the drug in pregnant women clearly outweigh potential benefits.
Example: N/A

Category N
The FDA has not classified the drug.
Example: Aspirin

Refer to each individual medication for any medication not listed in the above examples.

Adenosine (Adenocard)

CLASSIFICATION:
Endogenous Nucleoside

MECHANISM OF ACTION:
- A nucleoside with anti-arrhythmic activity
- Slows conduction time through AV node
- Interrupts re-entry pathways through the AV node
- It works both at the A-V node and in aberrant conduction pathways such as found in Wolff-Parkinson-White syndrome (WPW) or LGL phenomena
- While it may be used to treat all patients with supraventricular tachyarrhythmias, it works best in paroxysmal atrial tachycardia/SVT
- It has limited use in atrial fibrillation and atrial flutter

INDICATIONS:
Conversion of paroxysmal supraventricular tachycardia to sinus rhythm
Includes arrhythmias associated with accessory bypass tracts i.e. Wolff-Parkinson-White (WPW)

CONTRAINDICATIONS:
- 2nd- or 3rd-degree atrioventricular block
- Sinus node disease i.e. sick sinus syndrome or symptomatic bradycardia
- Known hypersensitivity

PRECAUTIONS:
- May produce short-lasting 1st-, 2nd-, or 3rd-degree heart block.
- Do not give additional doses if high-level block develops on 1st dose.
- Transient or prolonged asystole, respiratory alkalosis, ventricular fibrillation reported.
- New arrhythmias may appear on ECG at time of conversion.
- Caution with obstructive lung disease not associated with bronchoconstriction i.e. emphysema, bronchitis
- Avoid with bronchoconstriction/bronchospasm i.e. Asthma – known to cause bronchospasms
- D/C if severe respiratory difficulties develop.
- Caution in elderly.
- Does not convert atrial fibrillation/atrial flutter, or ventricular tachycardia to normal SR.
- Wide complex rhythms

ADULT DOSAGE:
- Doses should be given rapidly, directly into the most proximal IV site, and followed immediately by saline flush
- The initial dose in adults is 6 mg rapid IV bolus.
- Two further doses of 12 mg each can be given after a 1-2 minute interval if the tachyarrhythmia has not stopped.
- If after administration of adenosine the tachyarrhythmia stops briefly and resumes, further dosing will probably not be effective.

PEDIATRIC DOSAGE:
- Pediatric: 0.1 mg/kg rapid IV bolus
- Two further doses of 0.2 mg/kg each can be given after a 1-2 minute interval (as in the adult dosage pattern)
  - Do not exceed the adult dose

ADVERSE REACTIONS:
- Arrhythmias
- Chest pressure
- Facial flushing
- Nausea
- Dyspnea

Albuterol sulfate (Proventolin; ProAir)

CLASSIFICATION:
ß$_2$ agonist

MECHANISM OF ACTION:
- Selective ß$_2$ agonist
- Stimulates ß$_2$ receptors to cause relaxation of bronchial smooth muscle, used to treat reversible bronchospasm
- Peak bronchodilation occurs within 1-2 hrs and continues for 3-4 hrs after administration

INDICATIONS:
- Treatment of reversible bronchospasm in patients with reversible obstructive airway disease and acute attacks of bronchospasm
- Treatment in known hyperkalemia

CONTRAINDICATIONS:
- Known hypersensitivity
- Ventricular dysrhythmias witnessed during patient care
- Ventricular ectopy greater than 6 PVCs per minute that is witnessed during patient care

PRECAUTIONS:
- Caution with cardiovascular disorders i.e. coronary insufficiency, cardiac arrhythmias, hypertension, convulsive disorders, hyperthyroidism, and diabetes mellitus
- Aggravation of pre-existing diabetes mellitus and ketoacidosis reported
- May produce significant hypokalemia
- Re-evaluate patient and treatment regimen if deterioration of asthma is observed
- Fatalities reported with excessive use and with the home use of nebulizers
- Tachycardia may be disease-related
- May be less effective in patients on beta-blockers

ADULT DOSAGE:
- 0.083% nebulizer – 2.5 mg / 3 mL
- Max: 3 treatments

PEDIATRIC DOSAGE:
- 0.083% nebulizer – 2.5 mg / 3 mL
- Max: 3 treatments

ADVERSE REACTIONS:
- Tremors
- Tachycardia, PVCs, Palpitations
- Nervousness, Agitation
- Dizziness
- Headache, Insomnia
- Hyperglycemia
- Hypokalemia
- Nausea and Vomiting

Dopamine has been replaced with Norepinephrine for hypotension and shock states. Dopamine is associated with a greater number of adverse events including arrhythmias. Dopamine increases the MAP primarily by increasing heart rate, stroke volume, and cardiac output (acting at the heart), which increases the risk of harmful tachydysrhythmias. Norepinephrine, on the other hand, works primarily by vasoconstriction and has less effect on stroke volume and cardiac output, thereby decreasing the risk of tachydysrhythmias. Hence, many clinicians and protocols are moving towards norepinephrine for shock states.

No medication is perfect, and although norepinephrine has a decreased risk of dysrhythmias, it does act to vasoconstrict. Therefore, it is of exceeding importance to ensure (1) fluid resuscitation has been performed and (2) the patient's IV is patent and functioning to decrease the risk of extravasation.

Below you will find more detailed information regarding this medication as well as drip set calculations. Please contact me if you have any questions regarding the medication or its use.

Norepinephrine bitartrate (Levophed)

Duration/Half Life: 1-2 minutes
Onset: 1-2 minutes
Pregnancy Category C

CLASSIFICATION:
Sympathomimetic, vasopressor, adrenergic agonist, inotrope
α_1 agonist, α_2 agonist, ß$_1$ agonist

MECHANISM OF ACTION:
- Stimulates α_1 and α_2 receptors to cause vasoconstriction, increases peripheral vascular resistance, increases blood pressure
- Stimulates ß$_1$ receptors, increases heart rate, contractility, cardiac output

INDICATIONS:
- Severe hypotension due to any shock state associated with hypoperfusion (*after* appropriate fluid resuscitation)
  - *Note*: In cardiogenic shock/CHF cases (as evidenced by pulmonary edema, JVD, crackles, fluid overloaded status, etc.), fluid resuscitation should be judicious
- Septic shock

CONTRAINDICATIONS:
- Known hypersensitivity
- Volume depletion, hypovolemia, hypotension due to blood volume deficit
- Profound hypoxia

PRECAUTIONS:
- Start IV in antecubital fossa to lower risk of extravasation
- When administering, continually check IV site for patency and signs/symptoms of infiltration
- Check blood pressure continually (every 3 minutes) to ensure adequate clinical and hemodynamic response
- **Do not mix** with sodium bicarbonate
- Flush tubing well between drugs, or use Y-site secondary tubing for norepinephrine running into free-flowing normal saline primary tubing
- Caution in mesenteric or peripheral vascular disease (ischemia)

ADULT DOSAGE:
- Initiate only after adequate fluid resuscitation
  - *Note*: In cardiogenic shock/CHF cases (as evidenced by pulmonary edema, JVD, crackles, fluid overloaded status, etc.), fluid resuscitation should be judicious
- Range: 1 – 30 mcg/min. Initiate at 8 mcg/min. *Note*: If patient remains persistently hypotensive at 30 mcg/min, contact on-line OLMD.
- Titrate by 1 mcg/min to desired BP (MAP > 65)

PEDIATRIC DOSAGE:
- Initiate only after adequate fluid resuscitation

- **The use of norepinephrine in pediatrics must be discussed with on-line OLMD prior to use**. (*Pediatric patients in shock tend to present in cold shock, as opposed to warm shock. Therefore, epinephrine, as opposed to norepinephrine, is usually the preferred choice in pediatric patients. This warrants a discussion with OLMD.)*
- Range: 0.1 – 1.0 mcg/kg/min. Initiate at 0.1 mcg/kg/min. Titrate to desired BP and systemic perfusion

INFUSION RATE:

- Mix 4 mg of Levophed (concentration 4 mg/4 mL) into 1000 mL NS → 4 mcg/mL

ADULT INFUSION CHART

Infusion Rate	Admin Set: 10 drops/mL	Admin Set: 15 drops/mL
2 mcg/min	5 drops/min	7 drops/min
4 mcg/min	10 drops/min	15 drops/min
6 mcg/min	15 drops/min	22 drops/min
8 mcg/min	20 drops/min	30 drops/min
10 mcg/min	25 drops/min	37 drops/min
12 mcg/min	30 drops/min	45 drops/min
14 mcg/min	35 drops/min	52 drops/min
16 mcg/min	40 drops/min	60 drops/min
18 mcg/min	45 drops/min	67 drops/min
20 mcg/min	50 drops/min	75 drops/min
22 mcg/min	55 drops/min	82 drops/min
24 mcg/min	60 drops/min	90 drops/min
26 mcg/min	65 drops/min	97 drops/min
28 mcg/min	70 drops/min	105 drops/min
30 mcg/min	75 drops/min	112 drops/min

PEDIATRIC INFUSION CHART

Infusion Rate	Admin Set: 10 drops/mL	Admin Set: 15 drops/mL
0.1 mcg/kg/min		
10 kg	2 drops/min	3 drops/min
30 kg	7 drops/min	11 drops/min
50 kg	12 drops/min	18 drops/min
0.2 mcg/kg/min		
10 kg	5 drops/min	7 drops/min
30 kg	15 drops/min	22 drops/min
50 kg	25 drops/min	37 drops/min
0.3 mcg/kg/min		
10 kg	7 drops/min	11 drops/min
30 kg	22 drops/min	33 drops/min
50 kg	37 drops/min	56 drops/min
0.4 mcg/kg/min		
10 kg	10 drops/min	15 drops/min
30 kg	30 drops/min	45 drops/min
50 kg	50 drops/min	75 drops/min
0.5 mcg/kg/min		
10 kg	12 drops/min	18 drops/min
30 kg	37 drops/min	56 drops/min
50 kg	62 drops/min	93 drops/min
0.6 mcg/kg/min		
10 kg	15 drops/min	22 drops/min
30 kg	45 drops/min	67 drops/min
50 kg	75 drops/min	112 drops/min
0.7 mcg/kg/min		
10 kg	17 drops/min	26 drops/min
30 kg	52 drops/min	78 drops/min
50 kg	87 drops/min	131 drops/min
0.8 mcg/kg/min		
10 kg	20 drops/min	30 drops/min
30 kg	60 drops/min	90 drops/min
50 kg	100 drops/min	150 drops/min
0.9 mcg/kg/min		
10 kg	22 drops/min	33 drops/min
30 kg	67 drops/min	101 drops/min
50 kg	112 drops/min	168 drops/min
1.0 mcg/kg/min		
10 kg	25 drops/min	37 drops/min
30 kg	75 drops/min	112 drops/min
50 kg	125 drops/min	187 drops/min

ADVERSE REACTIONS:

- Hypertension
- Headache
- Tremor
- Anxiety / Restlessness
- Dysrhythmia
- Extravasation injury
- Tachycardia
- Reflex bradycardia
- Chest pain
- Increased oxygen demand
- Nausea / Vomiting