Utah EMS Protocol Guidelines: Cardiac

January 1, 2017

Cardiac Patient Care Guidelines

These guidelines were created to provide direction for each level of certified provider in caring for cardiac patients. All of these directions, dosages and provisions are subject to change with a later notice or revision of the guidelines. The OLMC physician will always be the final word on treatment in the field. If there are ever any discrepancies between the guidelines and the OLMC physician these should be documented and brought to the attention of the physician at the receiving hospital. If the explanation is not sufficient to the provider, then they may bring the issue to their medical director or the BEMSP
for review.

General Approach to Cardiac Patient Care Guidelines

- Assess your patient prior to initiating a guideline.
- More than one guideline may apply.
- If conflicts arise between treatment guidelines, contact OLMC for clarification.
- Providers may provide treatment up to the level of their certification only.
- Air Medical Transport Service personnel function under their own clinical guidelines.
- Contact your receiving hospitals and OLMC as soon as clinically possible for each patient.
- OLMC with a physician may change your treatment plan.
- Any variations to a guideline by the OLMC or physician should be clarified to ensure that the provider has properly characterized the situation.
- The OLMC Physician has the final word on treatment once contact is made.
- The OLMC Physician must approve usage of dosages in excess of the guidelines.

General Pediatric Considerations

- Pediatric reference based tape dosing is preferred over calculated dosages for infants and children.
- Pediatric lowest acceptable systolic blood pressures are: birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

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Ⓙ This symbol and yellow highlighted instructions precedes any treatment that requires OLMC prior to initiating the treatment unless otherwise specified.

CARDIAC ARREST

ALL PROVIDERS / EMT

- ☽ Focused history and physical exam
  - Assess for evidence that resuscitation should not be attempted per the ***Death Determination Guideline***.
- ❑ Continuous ECG, CO2, and Pulse Oximetry monitoring when available
- ❑ **Treatment Plan**
  - **Assess for presence of a pulse, respirations, and consciousness. If absent,**
  - **Begin chest compressions for 2 min**
  - **Apply AED and shock if advised.**
    - AEMT/PM: Apply cardiac monitor/defibrillator and shock if Vtach/Vfib
- ❑ **Key Considerations**
  - Effective chest compressions are critical
    - Minimize interruptions in chest compressions
    - Rate: 100-120/min
    - Depth: >2 cm (adult) / 1/3 of chest depth (pediatric)
    - Allow full chest recoil after each compression
    - After each shock, immediately perform 2 minutes of chest compressions before checking pulse
    - Rotate compressors every 2 minutes
  - Consider the Pit Crew model as an approach to treatment
    - Pre-defined roles, as determined by a specific EMS agency, for members of an integrated team of first responders, BLS, and ALS.
    - Designated individuals for chest compressions
    - Designated individual for overall code leadership/management
    - Designated individual for airway management
    - Additional roles to be assigned as determined by specific agency based on provider availability include: IO/IV access, medication administration, CPR quality monitoring, cardiac rhythm monitoring, defibrillation.
    - Consider transition of roles as additional providers become available to ensure maximal use of resources
    - Assume cardiac origins for all adult arrests unless evidence to the contrary. Consider underlying causes and treat when possible.
  - **H's & T's** - Treat as appropriate with confirmed or suspected Hypovolemia, Hypoxia, Hydrogen ion (Acidosis), Hyperkalemia, Hypothermia, Hypogylcemia, or specific Toxins.
- ❑ Pregnancy >20 weeks gestation
  - Perform manual displacement of the uterus to the patients left. If unable to perform manual displacement, place wedge-shaped cushion or multiple pillows under patient's right hip to achieve 30 degree lateral tilt.
  - Transport pregnant patients to the nearest emergency department without delay while attempting to provide continuous compressions and defibrillation if applicable. There is potential to perform emergency cesarean section.
- ❑ Pediatric Population
  - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years = 70mmHg + (age x 2), >10 years = 90mmHg.
  - Pediatric Defibrillation:
    - Age < 1 year: Manual defibrillator with pediatric paddles/pads preferred in patients <1. If not available, an AED may be used, preferably with pediatric pads.
    - Age 1 – 8 years: AED may be used with pediatric pads preferred
- ❑ As nationally-established cardiac care guidelines (e.g. ACLS, PALS) are updated, these may be integrated into performance, as per agency medical director.

ADULT

EMT

- Respiratory Management.
- **Witnessed arrest**, presumed cardiac etiology: Place an NP / OP airway and a non-rebreather mask during the first 2-3 cycles of CPR/defibrillation. After 2-3 cycles, apply asynchronous BVM breaths at a rate of 1 breath every 6-8 seconds, if available
- **Unwitnessed arrest or evidence of a non-cardiac cause**: Apply asynchronous BVM breaths at a rate of 1 breath every 6-8 seconds

AED

- Defibrillate immediately if AED advises shock.

❑ Resume CPR immediately after each shock and continue for 2 minutes

❑ Check pulse

AEMT

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed adult dosing.

EMT

❑ Respiratory Management:
- Place an NP or OP airway and apply asynchronous BVM breaths at a rate of 1 breath every 4-6 seconds

AED

❑ Defibrillate immediately if AED advises shock
- Resume CPR immediately after each shock and continue for 2 minutes
- Check pulse

AEMT

ALL RHYTMS

- Begin CPR, as above

❑ Advanced airway, vascular access and fluid therapy per the ***IV/IO Access and Fluid Therapy Guidelines***
❑ Consider placement of a supraglottic device after first 2-3 cycles of CPR/defibrillation
❑ Placement of supraglottic device should not interrupt chest compressions
❑ **Epinephrine**
❑ **1 mg (0.1mg/ml = 1:10,000)** IV/IO push
  - Repeat every 3-5 minutes as long as patient remains pulseless
  - Begin 1000cc IV NS Bolus

SHOCKABLE RHYTHM (VF/VT) PRESENT

❑ **Defibrillation**
❑ **360J** for a monophasic defibrillator or **200J** for a biphasic
❑ Resume CPR immediately after shock and continue for 2 minutes
❑ Check rhythm and pulse

❑ **Anti-arrhythmics**
❑ May use any **ONE** anti-arrhythmic available
  - **Amiodarone** 300 mg IV/IO, second dose is 150mg IV/IO
  - **Lidocaine** 1-1.5 mg/kg IV push or one time dose of 1.5 mg/kg. May repeat every 3-5 min up to 3 mg/kg.

❑ Contact OLMC before terminating resuscitative efforts in the field

ALL RHYTMS

- Begin CPR, as above

❑ BVM and advanced airway, vascular access and fluid therapy per the ***IV/IO Access and Fluid Therapy Guidelines***
❑ **Epinephrine**
❑ **0.01mg/kg = 0.1 ml/kg (0.1 mg/ml = 1:10,000**) IV/IO push
❑ Repeat every 3-5 minutes as long as patient remains pulseless
  - Begin 20ml/kg bolus of NS, reassess and repeat if needed to a max of 60cc/kg

SHOCKABLE RHYTHM (VF/VT) PRESENT

❑ **Defibrillation**
❑ **2 J/kg** for the first shock with either a monophasic or biphasic defibrillator. Second and subsequent shocks at **4 J/kg**
❑ Resume CPR immediately after shock and continue for 2 minutes
❑ Check rhythm and pulse

❑ **Anti-arrhythmics**
❑ May use any **ONE** antiarrhythmic available
  - **Amiodarone** 5 mg/kg IV/IO. May repeat up to 2 times. Do not exceed 300mg
  - **Lidocaine** 1 mg/kg IV/IO/ET. May repeat every 3-5 min up to 3 mg/kg.

❑ Contact OLMC before terminating resuscitative efforts in the field

PARAMEDIC

ALL RHYTMS

- May consider endotracheal intubation

❑ Intubation must not interfere with chest compressions

SHOCKABLE RHYTHM (VF/VT) PRESENT

❑ **Magnesium**
❑ Give **2 gm** IV over 2 minutes for torsades de pointes
◑ Contact OLMC for further orders or therapies

PARAMEDIC

ALL RHYTMS

- May consider endotracheal intubation, if unable to adequately ventilate with BVM (preferred) or supraglottic airway

❑ Intubation must not interfere with chest compressions

SHOCKABLE RHYTHM (VF/VT) PRESENT

❑ **Magnesium**
❑ Give **25-50 mg/kg** IV/IO for torsades de pointes. Maximum 2 grams
◑ Contact OLMC for further orders or therapies

BRADYCARDIA (Symptomatic)

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam
  - Assess for signs of poor perfusion, hypotension, altered mental status, signs of shock, chest pain, or acute heart failure.
  - Obtain a blood glucose level.
- ❑ Continuous ECG, CO2, 12 lead ECG, and pulse oximetry monitoring, when available
- ❑ **Treatment Plan**
  - Only treat bradycardia IF the patient is unstable (hypotension or signs of poor perfusion).
  - If patient is a newborn, follow the ***Newborn Resuscitation Guideline***.
  - Identify and treat the underlying cause:
    - Hypoxia
    - Shock
    - 2nd or 3rd degree heart block
    - Toxin exposure (beta-blocker, calcium channel blocker, organophosphate, digoxin)
    - Electrolyte disorder (hyperkalemia)
    - Increased intracranial pressure (ICP)
    - Hypothermia
    - Acute MI
    - Pacemaker failure
  - Maintain airway; assist with breathing as necessary, provide oxygen
- ▪ **Pediatric patient** (<8-year-old)
  - Aggressive oxygenation with high flow oxygen and assisted ventilations with a BVM, as indicated.
  - Persistent heart rate <60/min and signs of poor perfusion following aggressive oxygenation and ventilation: begin chest compressions.
  - Ensure patient warmth.
- **Key Considerations**
  - In pregnant patients of >20 weeks' gestation: Place wedge-shaped cushion or multiple pillows under patient's right hip to displace uterus to the left, off of the vena cava.
  - As nationally-established cardiac care guidelines (e.g. ACLS, PALS) are updated, these may be integrated into performance, as per agency medical director.
  - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

AEMT

- ❑ Advanced airway, vascular access and fluid therapy per ***IV/IO Access and Fluid Therapy Guidelines***
- ❑ **Atropine 0.5 mg** IV/IO
  - Repeat as needed every 3 minutes
  - Maximum total dose of 3mg
- ❑ **Epinephrine: 1 mg (0.1 mg/ml/1:10,000)** IV/IO push
  - Repeat every 3-5 minutes

PARAMEDIC

SYMPTOMATIC BRADYCARDIA

- ❑ **Transcutaneous pacing (TCP)** at an initial rate of 80

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- ❑ Supportive care of airway, vascular access and fluid therapy per ***IV/IO Access and Fluid Therapy guidelines***
- ❑ **Atropine 0.02 mg/kg** IV/IO
  - Minimum single dose of 0.1 mg
  - Maximum single dose of 0.5mg
  - Repeat Atropine every 3-5 minutes as needed until Max 1mg for child and 2mg for adolescents.
- ❑ **Epinephrine: 0.01 mg/kg = 0.1 ml/kg (0.1 mg/ml/1:10,000)** IV/IO
  - Repeat every 3-5 minutes

PARAMEDIC

IF BRADYCARDIA IS SEVERE WITH SIGNS OF POOR PERFUSION

beats per minute if the patient does not respond to medications

- ❑ Consider Sedation for TCP as per the ***Violent Patient / Chemical Sedation Protocol***
- ❑ **Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters**.
- ❑ **Epinephrine 2–10 mcg/min** IV/IO infusion for persistent hypoperfusion. Titrate to maintain a SBP >100 mmHg. **And/or**
- ❑ **Norepinephrine initial dose: 0.5-1 mcg/minute** IV/IO titrated to effect. For patients in refractory shock: 8-30mcg/min

- ❑ **Transcutaneous pacing (TCP)** at an initial rate of 100 beats per minute, if the patient does not respond to medications
- ❑ Consider Sedation for TCP as per the ***Violent Patient / Chemical Sedation Protocol***
- ❑ **Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters**
- ❑ **Epinephrine 0.1–2 mcg/kg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg

CARDIAC CHEST PAIN (ACUTE CORONARY SYNDROME)

ALL PROVIDERS

- ❑ Focused history and physical exam
  - Assess for signs or symptoms suggestive of ischemia or infarction.
  - Ask patient to describe the pain utilizing the O-P-Q-R-S-T mnemonic.
    - Onset of the event, Provocation or Palliation, Quality of the pain, Region and Radiation, Severity, Time (history)
  - Determine whether the patient (male or female) has taken erectile dysfunction medications such as Viagra, Levitra or Cialis within the last 24 hours.
- ❑ Continuous ECG, CO2, and pulse oximetry monitoring, when available.
- ❑ **Treatment Plan**
  - Chest pain patients should only receive oxygen therapy as needed to target O2 saturations ~94%
- ❑ **Key Considerations**
  - As nationally-established cardiac care guidelines (e.g. ACLS, PALS) are updated, these may be integrated into performance, as per agency medical director.
  - Assess blood glucose level.

ADULT

EMT

- ❑ **325 mg baby aspirin** po if patient is >18 years old and no reported allergies to aspirin
  - Administer even if patient takes a daily dose
- ❑ **Nitroglycerin 0.4 mg** SL every 5 minutes, up to 3 doses, as long as symptoms persist and SBP >100 mmHg
  - Do not administer nitroglycerin if patient (male or female) has taken erectile dysfunction medications within 24 hours

AEMT

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

AEMT

- ❑ Advanced airway, vascular access and fluid therapy per ***IV/IO Access and Fluid Therapy Guidelines***
- ❑ IV access prior to administration of nitroglycerin is preferable, if possible
- ❑ 12 Lead EKG (If available)
- ❑ If the patient has a STEMI then transport to the closest available STEMI/PCI receiving center (if available) and give advanced notification of ECG findings and transmission of ECG if possible.
    - Confirm that a catheterization lab will be available for the patient. If NOT then consider transporting to a different STEMI/PCI receiving center
    - Confirm with online medical control if needed
- ❑ **Normal Saline 500 mL** IV over 30 minutes, unless there are signs of congestive heart failure
- ❑ **Nitroglycerin 0.4 mg (every 5 minutes) (max of 3 doses)** SL as long as symptoms persist and SBP >100 mmHg
    - Administer with caution in patients with known inferior ST-Elevation MI
    - Do not administer nitroglycerin if the patient (male of female) has taken erectile dysfunction medications within the last 24 hours
    - If hypotension occurs following nitroglycerin administration, administer 500mL bolus of NS and withhold further nitroglycerin.
- ❑ Pain medications per ***Pain and Anxiety Management Guideline***

PARAMEDIC

- ❑ Contact OLMC for further instructions.

- ❑ Chest pain with cardiac origin is a rare in children, consider other causes;
    - Asthma
    - Foreign body
    - Infection
    - Trauma

PARAMEDIC

- ❑ Contact OLMC for further instructions.

CONGESTIVE HEART FAILURE / PULMONARY EDEMA

ALL PROVIDERS

- ❑ Focused history and physical exam
  - Determine whether the patient (male or female) has taken erectile dysfunction medications such as Viagra, Levitra or Cialis within the last 24 hours.
  - Assess blood glucose level.
- ❑ Continuous cardiac monitoring, CO2, 12 lead ECG, and pulse oximetry monitoring, when available
- ❑ **Treatment Plan**
  - Maintain airway; assist with breathing as necessary, provide oxygen as needed to target SpO2 90-94%.
- ❑ **Key Considerations**
  - Do not use nitroglycerin if the patient has taken erectile dysfunction medications in the last 24 hours.
  - Spinal motion restriction per ***Selective Spinal Immobilization Guideline***
  - In pregnant patients of >20 weeks gestation: Place wedge-shaped cushion or multiple pillows under patient's right hip and manually displace the uterus.
  - Current nationally established certification programs (e.g. ACLS, PALS) may be used in lieu of these resuscitation guidelines.
  - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

EMT

- ❑ Assist patient with prescribed nitroglycerin SL every 5 minutes, up to 3 doses, as long as dyspnea or chest pain persist and SBP >100 mmHg
  - Do not administer nitroglycerin if the patient (male or female) has taken erectile dysfunction medications within the last 24 hours

AEMT

- ❑ Advanced airway, vascular access and fluid per ***IV/IO Access and Fluid Therapy guidelines***
  - IV access prior to nitrates is preferred if possible
  - Limit fluid bolus to 250–500 mL NS
- ❑ **Nitroglycerin 0.4 mg** SL every 5 minutes (max of 3 doses) if dyspnea or chest pain persist and SBP >100 mmHg. Maximize nitroglycerin before considering morphine
- ❑ **Morphine Sulfate 2 – 4 mg** IV once if SBP >100 mmHg
- ❑ **CPAP/BiPAP** – Consider when the patient is awake and cooperative and needs assistance with oxygenation and ventilation
  - Explain the procedure to the patient
  - **CPAP** - Provide 10 L/min oxygen and PAP at 10 cm H2O
  - **BIPAP** – Provide 10 L/min oxygen and IPAP at 10 cm H2O with EPAP at 5 cm H2O

✆ Contact OLMC to discuss further settings and treatment above the initial setup.

PARAMEDIC

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

✆ Contact On-Line Medical Consultation

AEMT

✆ Contact On-Line Medical Consultation

- ❑ Advanced airway, vascular access and fluid per ***IV/IO Access and Fluid Therapy guidelines***
- ❑ **CPAP/BiPAP** – ONLY use when the patient is on the machine at home. Maintain home settings and bring machine with the patient. If unable to adequately ventilate return to BVM or advanced airway

PARAMEDIC

- **Epinephrine 2 mcg/min** IV/IO infusion for shock. Titrate up to 10 mcg/min to maintain a SBP >100 mmHg

OR

- **Norepinephrine 1 mcg/min** IV/IO for shock. Titrate up to 30 mcg/min to maintain SBP >100 mmHg.
- Contact OLMC to discuss further settings, dosage, and treatment.

- **Epinephrine 0.1–2 mcg/kg/min** IV/IO infusion for shock. Titrate to maintain a SBP >70 + (age in years x 2) mmHg.

EKG INSTRUCTIONS

ADULT

AEMT

- ❑ Perform 12 Lead EKG (If available) on the following patients:
  - Pain in chest or upper abdomen
  - New cardiac dysrhythmia
  - Unexplained syncope or near syncope
  - Unexplained acute general weakness
  - Acute dyspnea suggestive of congestive heart failure
  - Cardiac arrest if spontaneous circulation returns
  - Concern for ACS/STEMI
- ❑ Do **NOT** attempt an EKG if the following are present:
  - Severe trauma
  - Cardiac or respiratory arrest with ongoing resuscitation
  - Life-threatening situation when an EKG would hinder your ongoing efforts
  - Uncooperative patient
- ❑ Acquire and transmit EKG to a STEMI/PCI Receiving Center (if available) or nearest EKG receiving facility depending on local availability
  - All completed EKG's should be transmitted from the field
  - Remember that not all automated readings are correct
- ❑ If the patient has a STEMI/PCI then transport to the closest available STEMI/PCI Receiving Center.
  - Advise receiving hospital of possible STEMI as soon as identified and in advance of arrival.
  - Confirm that a catheterization lab will be available for the patient. If NOT then consider transporting to a different STEMI/PCI receiving center, based on medical control guidance

PARAMEDIC

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- ❑ 12 Lead EKG (If available) on the following patients:
  - Pain in chest or upper abdomen
  - New cardiac dysrhythmia
  - Unexplained syncope or near syncope
  - Unexplained acute general weakness
  - Acute dyspnea suggestive of congestive heart failure
  - Post arrest if spontaneous circulation returns
  - Concern for ACS/STEMI
- ❑ Do **NOT** attempt an EKG if the following are present:
  - Severe trauma
  - Cardiac or respiratory arrest with ongoing resuscitation
  - Life-threatening situation when an EKG would hinder your ongoing efforts
  - Uncooperative patient
- ❑ Acquire and transmit ECG as per adult recommendations
- ✆ Destination guidelines as per OLMC

PARAMEDIC

LEFT VENTRICULAR ASSIST DEVICE (LVAD)

ALL PROVIDERS

- ❑ Focused history and physical exam
  - Assess for evidence that resuscitation should not be attempted per the ***Death Determination Guideline***.
  - Evaluate for Medic Alert Bracelet with instructions. Follow instructions as able.
  - The device consists of an implanted, continuous flow pump attached to the left ventricle, an external control device, and power supply secured by a harness.
  - Every patient should have a backup equipment bag for his or her LVAD.
  - Patients and families are usually well educated on the power supply of their LVAD and the use of the backup controller/driver. Utilize them and follow their directions on scene.
  - Continuous ECG, rhythm analysis, blood pressure, and pulse oximetry saturation assessment.
  - Patients with continuous flow assist devices will not have a palpable pulse. Assess for signs of adequate perfusion using skin signs, mentation, and blood pressure.
- ❑ **Treatment Plan**
  - Check to see if the patient is responsive.
  - Check if the LVAD is functioning by listening for a HUM.
  - Check the patient's rhythm.
  - Check for alarm lights and sounds – Red high-priority alarms are URGENT.
  - Check cable connections.
  - Check power source.
  - Change controller if needed.
  - Priority is placed on restarting the pump. If unable to restart pump, begin chest compressions on upper half of the sternum.
- ❑ **Key Considerations**
  - Determine type of device – Heart Mate II, Jarvik 2000, or Heartware
  - Patients or their families should have a phone number to their LVAD coordinator. This person should be used as online medical control (OLMC).
  - Preferably transport to the specialty center that implanted the device, as directed by OLMC
  - IF the number is not available, contact either of the LVAD coordinators below for assistance:
    - University of Utah: 801-581-2121 (ask for LVAD coordinator)
    - Intermountain Medical Center: 801-507-LVAD

ADULT

EMT

- ❑ BLS airway support as needed

AEMT

- ❑ Supportive care of airway, vascular access and fluid therapy per ***IV/IO Access and Fluid Therapy Guidelines***
- ❑ LVADs are preload dependent and a fluid bolus may improve perfusion

PARAMEDIC

- ❑ ACLS medications as indicated

NEWBORN RESUSCITATION

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam: Term baby? Breathing? Tone?
- ❑ Continuous ECG, CO2, and pulse oximetry monitoring, when available
- ❑ **Treatment Plan**

  If the newborn is apneic, slow to respond, has slow or gasping respirations, or persistent central cyanosis
  - **First 30 seconds**: Warm, dry, and stimulate the baby. Consider suction (bulb syringe) mouth, then nose.
    - Evaluate respirations, heart rate, and activity
  - **Next 30 seconds:** If after first 30 seconds the baby remains apneic, lethargic, and/or has HR <100, then perform 30 seconds of positive pressure ventilation (PPV) with BVM with a rate of 40-60 breaths/minute
    - Watch for chest rise to ensure adequate ventilations. If none, reposition mask seal and increase pressure slightly
    - Target O2 saturations to 90 – 92%; excessive oxygenation can be harmful to the newborn brain
    - Target PPV efforts to improving tone and increasing heart rate; titrate up O2 if HR remains <100 despite adequate PPV
  - **Next 30 seconds:** If after an additional 30 seconds of effective PPV the baby continues to have a HR<60, begin CPR with a breath/compression ratio of 1:3.

    -use 2 thumb encircling technique for CPR, rate of 120 compressions/min
  - Check glucose and treat if <30 mg/dl
- ❑ **Key Considerations**
  - As nationally-established neonatal resuscitation guidelines (NALS, NRP, etc.) are updated, these may be integrated into performance, as per agency medical director
  - Keep baby as warm as possible

AEMT

- ❑ Advanced airway placement may be indicated when:
  - BVM has been ineffective despite repositioning infant and checking equipment
  - Chest compressions are necessary
- ❑ IV or IO at a keep open rate (approx 10ml/hr) after boluses to avoid volume overload
  - IV required only when required for fluid resuscitation or parenteral medication
  - IO infusions are only indicated when life-threatening conditions are present
- ❑ **Epinephrine**
  - **0.01-0.03 mg/kg = 0.1-0.3 ml/kg (0.1 mg/ml/1:10,000)** IV or IO for HR <60/min despite 30 seconds of effective CPR with PPV
  - Repeat every 3-5 minutes until spontaneous heart rate remains >60 bpm

EVIDENCE OF HYPOPERFUSION OR HYPOVOLEMIA

- ❑ NS (IV or IO) @ 10 mL/kg syringe bolus over 5-10 min
- ❑ Run D10 if available for maintenance fluid at 10 ml/hr after bolus
- ❑ Additional boluses require physician approval

PARAMEDIC

- ❑ Endotracheal intubation may be indicated when:
- ❑ BVM has been ineffective despite repositioning infant and checking equipment
- ❑ Chest compressions are necessary
- ❑ Insert a gastric tube in all intubated patients
- ❑ Suction the trachea using a suction catheter through the endotracheal tube or directly suction the trachea with a meconium aspirator for poor chest rise despite successful intubation
- ❑ **Dextrose 10%** per ***Glucose Emergencies - Hypoglycemia/Hyperglycemia Guidelines***

OPTIONAL ORDERS BY MEDICAL CONSULTATION ONLY

- ❑ Sodium bicarbonate 1-2 mEq/kg IV or IO-use caution; not recommend except in specific cases

POST CARDIAC ARREST
RETURN OF SPONTANEOUS CIRCULTATION (ROSC)

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam
  - Blood glucose assessment
- ❑ Continuous ECG, CO2, and pulse wximetry monitoring, when available
- ❑ **Treatment Plan**
  - Preferential transport to a STEMI/PCI receiving center, if available.
  - **Initiate Targeted Temperature Management** (TTM):
    - **Inclusion Criteria:**
      - Cardiac arrest with ROSC
      - >14 years of age
      - Unable to follow commands
    - **Contraindications:**
      - POLST order specifying "Do not attempt resuscitation"
      - Coma unrelated to cardiac arrest (e.g. Intoxication, sepsis, trauma, CVA, status epilepticus)
      - Patient is awake and alert
    - Maintain body temperature at/below 36 degrees C. / 97 degrees F. by:
      - Keeping patient uncovered
      - Ice packs to groin, axilla, neck
      - Water spray and fan
    - ◑ **Pediatric Considerations:** Contact OLMC for consideration of Targeted Temperature Management

1.

ADULT

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- ❑ Advanced airway, vascular access and fluid therapy per ***IV/IO Access and Fluid Therapy Guideline***
- ❑ **Lidocaine 0.5-1.5 mg/kg** IV (if not given during the arrest), followed by continuous infusion of 2-4 mg/min

AEMT

- ❑ Advanced airway, vascular access and fluid therapy per ***IV/IO Access and Fluid Therapy guidelines***
- ◑ Monitor closely for hypotensive shock. Consult with OLMC for direction if blood pressure is less than pediatric lowest acceptable systolic blood pressures
  - Birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

PARAMEDIC

PARAMEDIC

- ❑ **Epinephrine (1:1000) 2–10 mcg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg.
  And/or
- ❑ **Dopamine 2-20 mcg/kg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg. (Goal is to maintain a mean arterial pressure (MAP) >70 mmHg)

TACHYCARDIA
(With a Pulse)

ALL PROVIDERS

- ❑ Focused history and physical exam
  - Assess blood glucose level
- ❑ Continuous ECG, CO2, and Pulse Oximetry monitoring when available
- ❑ Perform a 12 EKG if possible.
- ❑ **Treatment Plan** (develop and implement plan based on assessment findings, resources, and training)
  - Identify and treat the underlying cause (e.g. hypotension, pain, medication, heart failure, etc.)
- ❑ **Key Considerations**
- ❑ Spinal motion restriction per ***Selective Spinal Immobilization Guideline***
- ❑ Pregnancy >20 weeks gestation - Place wedge-shaped cushion or multiple pillows under patient's right hip.
- ❑ Current nationally established certification programs (e.g. ACLS, PALS, etc.) may be used in lieu of these resuscitation guidelines.
- ❑ Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

AEMT

- ❑ Vascular access and fluid therapy per ***IV/IO Access and Fluid Therapy Guidelines***

Suprventricular Tachycardia (SVT)

- ❑ Obtain a 12 Lead EKG, if possible
- ❑ Maneuvers to increase vagal tone: valsalva, ice pack to face, Trendelenburg, urination, etc.)

PARAMEDIC

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- Vascular access and fluid therapy per **IV/IO Access and Fluid Therapy Guidelines**

Supraventricular Tachycardia (SVT)

- Infants: rate usually greater than 220 bpm with no variation
- Children: rate usually greater than 180 bpm with no variation

- ❑ Obtain a 12 Lead EKG is possible, if possible
- ❑ Maneuvers to increase vagal tone: valsalva, ice pack to face, Trendelenburg, urination, etc.)

PARAMEDIC

Supraventricular Tachycardia (SVT)

- ❑ **Adenosine**
  - Indicated for patients with prior SVT who have responded to adenosine previously
  - **Initial dose: 6 mg IV**
  - **May repeat once: 12mg IV**

Stable Wide Complex (QRS > 120 msec) Tachycardia

- ❑ Transport to ED with IV in place and careful monitoring

Unstable Tachycardia – Synchronized Cardioversion

Signs/Symptoms of Unstable Tachycardia

- Acute cardiac chest pain
- Acute congestive heart failure / pulmonary edema
- Altered mental status
- SBP <90 mm Hg
- Signs of shock:
  - Cool, clammy, or pale skin
  - Weak or thready pulse

Synchronized Cardioversion

- Indicated for unstable patients
- These are initial doses.
- Narrow Regular: **50-100J** (mono- or bi-phasic)
- Narrow Irregular: **120-200J** biphasic and 200J monophasic
- Wide Regular: **100J** (mono- or bi-phasic)
- Wide Irregular: defibrillate without synchronization

Consider Sedation prior to Cardioversion as per the Violent Patient/Chemical Sedation Guideline

Supraventricular Tachycardia (SVT)

- ❑ **Adenosine**
  - Indicated for patients with prior known SVT who have responded to adenosine previously
  - **Initial dose: 0.1mg/kg IV (to max 6mg)**
  - **May repeat once: 0.2mg/kg IV (to max 12mg)**

Stable Wide Complex (QRS > 120 msec) Tachycardia

- ❑ Transport to ED with IV in place and careful monitoring

Unstable Tachycardia – Synchronized Cardioversion

Signs/Symptoms of Unstable Tachycardia

- Acute congestive heart failure / pulmonary edema
- Altered mental status
- Low BP for age
- Signs of shock:
  - Cool, clammy, or pale skin
  - Weak or thready pulse

Synchronized Cardioversion

- Indicated for unstable patients
- Initial energy dose is 0.5-1 J/kg
- If no response, double energy dose to 2 J/kg

Consider Sedation prior to Cardioversion as per *Violent Patient/Chemical Sedation Guideline*