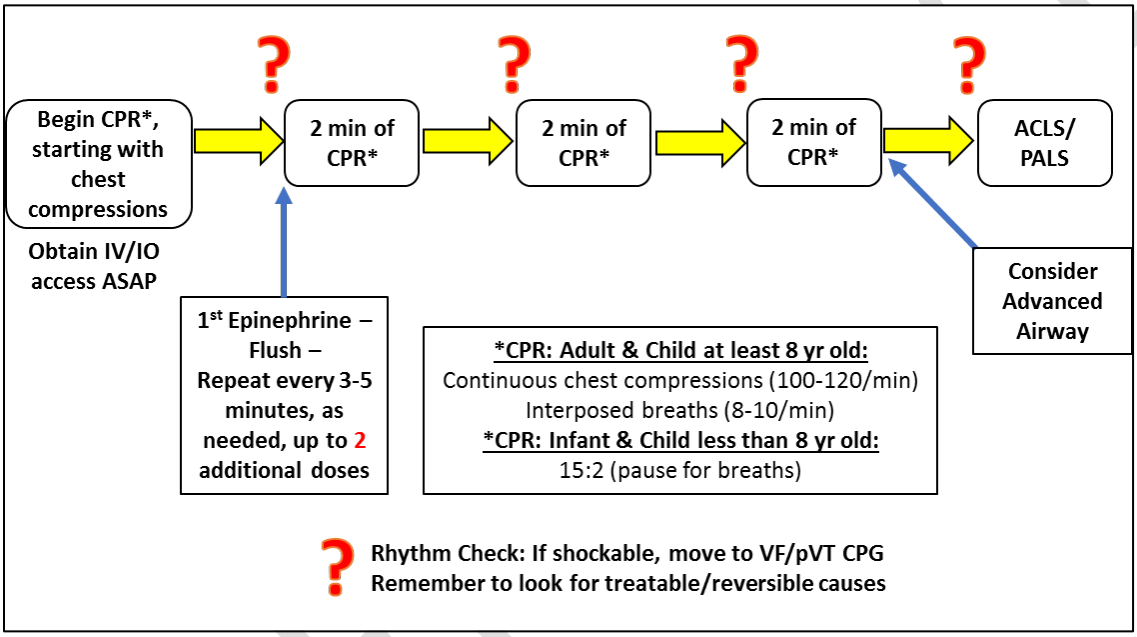
Resuscitation:
Asystole/Pulseless Electrical Activity (PEA)

Goals: Return of Spontaneous Circulation (ROSC) with preserved neurologic function
Inclusion Criteria: Patients in cardiac arrest with "non-shockable" cardiac rhythm
Exclusion Criteria: Severe hypothermia (see Cold Emergencies CPG); valid out-of-hospital DNR order; blunt traumatic cardiac arrest with confirmed asystole (not PEA); neonates (refer to Neonatal Care CPG)
Refer to: Cardiac Arrest, VFib/pulselessVTach and Post-Cardiac Arrest CPGs; Determination of Death Policy

- **NOTE:** ALS units may discontinue resuscitation efforts for victims of blunt or penetrating traumatic cardiac arrest, **IF** no signs of life are present **AND** the patient remains in asystole.



Basic Level

1. Assess and support ABCs according to UNIVERSAL CARE – ADULT or UNIVERSAL CARE – PEDIATRIC, as clinically indicated, using the modified "CAB" sequence for cardiac arrest:
   a. **C (Circulation):** Immediately begin high-quality, minimally-interrupted CPR, starting with chest compressions:
      i. Place the patient supine on a firm surface with adequate space to perform team-based CPR
      ii. Power on AED/defibrillator and apply hands-free defibrillation pads to patient's bare chest
      iii. A metronome shall be used for all CPR incidents (chest compression rate: 100-120/minute)
   b. **A (Airway):** Ensure airway patency, using OPA and/or NPA adjunct and suctioning
      i. Jaw thrust is preferred if trauma is suspected; refer to Spinal Motion Restriction Policy
   c. **B (Breathing):** Assist ventilations with 100% FiO_2 and 8-10 gentle, one-handed BVM breaths per minute over 1-1.5 seconds each, just enough to cause chest rise (avoid over-ventilation)
2. If time permits, perform a POC Glucose analysis and treat according to the Diabetic Emergencies CPG
   a. Do not administer glucose unless there is documented hypoglycemia
3. Perform a focused Secondary Survey and SAMPLE history, as conditions permit
   a. Look for signs of traumatic injury (including drowning), drug overdose and other special conditions

Advanced Level

1. Assess and support vital functions, focusing on immediate, high-quality, minimally-interrupted CPR:
   a. Initiate $PetCO_2$ monitoring as soon as possible:

i. Low $PetCO_2$ value may indicate overly aggressive ventilation or inadequate chest compressions
ii. Normal or high $PetCO_2$ value may indicate ROSC, even before a pulse is palpable

b. Ensure that manual monitor/defibrillator is in MANUAL mode and in PADDLES lead:
i. Exception: some agencies may use a manual device in "AED mode" for ADULTS only, depending on AED mode configuration, agency MOP/SOP, and specific Medical Direction authorization.

2. Confirm asystole (if suspected) by checking lead connections, monitor power and signal gain:
   a. However, do not waste time to confirm asystole by checking multiple leads
3. Do not attempt advanced airway placement for at least 6 minutes (three, 2-minute cycles of CPR), unless necessary because of regurgitation:
   a. Minimize interruption to chest compressions during advanced airway insertion
4. Establish IV/IO access as soon as possible, but NOT before CPR or AED/defibrillator application
5. Administer epinephrine **(0.1 mg/mL)**:
   a. ADULT at least 14 years of age: 1 mg (10 mL) IVP or IO, with normal saline (NS) flush
      i. May repeat up to two more doses, every 3 to 5 minutes as needed (maximum total = 3 doses)
      ii. Contact BioTel for authorization for additional doses, if needed

b. Pediatric patients less than 14 years of age: 0.01 mg/kg (0.1 mL/kg) IVP or IO, with NS flush
i. May repeat up to two more doses, every 3 to 5 minutes, as needed (maximum total = 3 doses)
ii. Contact BioTel for authorization for additional doses, if needed

6. Search for and treat potentially reversible causes and special circumstances:
   a. **Hypoxia:** Assist ventilations with 100% FiO_2; confirm airway patency and/or proper advanced airway placement with continuous $PetCO_2$ monitoring
   b. **Hypothermia:** Protect from further heat loss; refer to Cold Emergencies CPG
   c. **Overzealous ventilation:** Provide only 8 to 10 gentle breaths over 1-1.5 seconds each during CPR
   d. **Hypovolemia:** Infuse 20 mL/kg (up to 1000 mL maximum per bolus) Normal Saline IV/IO
      i. May repeat twice, as needed, if no signs of volume overload (rales, JVD, frothy sputum)
   e. **Hyperkalemia (renal failure or dialysis) OR pre-existing metabolic acidosis (e.g. methanol ingestion, aspirin overdose) OR tricyclic antidepressant overdose**: Sodium bicarbonate 1 mEq/kg IVP or IO
   f. **Opioid overdose (known or suspected):** Administer naloxone after starting CPR
      i. ADULT at least 14 years of age: 0.4 mg IV/IO/IM or 2 mg IN; repeat once after 4 minutes, if needed
      ii. Pediatric patients less than 14 years of age: 0.1 mg/kg IV/IO/IM; repeat once after 4 min, if needed
   g. **Beta-Blocker overdose:**
      i. ADULT at least 14 years of age: Administer Glucagon 1-2 mg IV/IO/IM/IN
         1. May repeat once after 20 minutes, if needed
      ii. Pediatric patients less than 1 year of age: Glucagon 0.5 mg IV/IO/IM/IN
      ii. Pediatric patients 1 to 13 years of age: Glucagon 1 mg IV/IO/IM/IN
         1. May repeat once after 20 minutes, if needed
   h. **Calcium-Channel Blocker overdose:**
      i. ADULT at least 14 years of age: Administer Calcium Chloride (10%) 10-15 mg/kg (0.1 mL/kg-0.15 mL/kg) IVP or IO (optional medication)
      ii. Pediatric patients less than 14 years of age: Contact BioTel for authorization and dosing
   i. **Tension pneumothorax (known or suspected):** Perform needle thoracostomy on affected side and contact BioTel as soon as possible (Refer to Needle Thoracostomy Procedure)
   j. **Cardiac tamponade (suspected, based on history/mechanism):** Infuse 20 mL/kg (up to 1000 mL maximum per bolus) Normal Saline IV/IO
   k. **Prolonged resuscitation (greater than 15 minutes):**
      i. Consider Sodium bicarbonate 1 mEq/kg IVP or IO
      ii. Consider Calcium chloride (as above, section 6.h.)
7. In the event of return of spontaneous circulation (ROSC), refer to Post-Cardiac Arrest Care CPG
8. If there is no response to therapy and no evidence of reversible causes of asystole or PEA, consider terminating resuscitation efforts in the field: Refer to Termination of Resuscitation Efforts section of the Determination of Death Policy
9. For additional patient care considerations not covered under standing orders, consult BioTel