



COUNTY OF VENTURA HEALTH CARE AGENCY		EMERGENCY MEDICAL SERVICES POLICIES AND PROCEDURES	
Policy Title: Cardiac Arrest Management (CAM) and Post Arrest (ROSC) Resuscitation		Policy Number 733	
APPROVED: Administration:	 Steven L. Carroll, Paramedic	Date: June 1, 2019	
APPROVED: Medical Director:	 Daniel Shepherd, MD	Date: June 1, 2019	
Origination Date:	April 30, 2016		
Date Revised:	March 14, 2019	Effective Date: June 1, 2019	
Date Last Reviewed:	March 14, 2019		
Next Review Date:	March 31, 2020		

- I. PURPOSE: To establish a standardized procedure for the treatment of patients in cardiac arrest, and for those who have a return of spontaneous circulation (ROSC) following treatment for cardiac arrest
- II. AUTHORITY: California Health and Safety Code, Section 1797.220, and 1798.  
California Code of Regulations, Title 22, Section 100170.
- III. POLICY:
  - A. For all patients in cardiac arrest and are greater than 48 hours old, CAM protocol will be followed. Patients less than 48 hours old will follow VC EMS Neonatal Resuscitation Policy # 705.16. For patients who are 18-years-old and older, who achieve ROSC following a cardiac arrest that is non-traumatic in nature, post arrest (ROSC) protocol outlined in Section V of this policy will be followed.

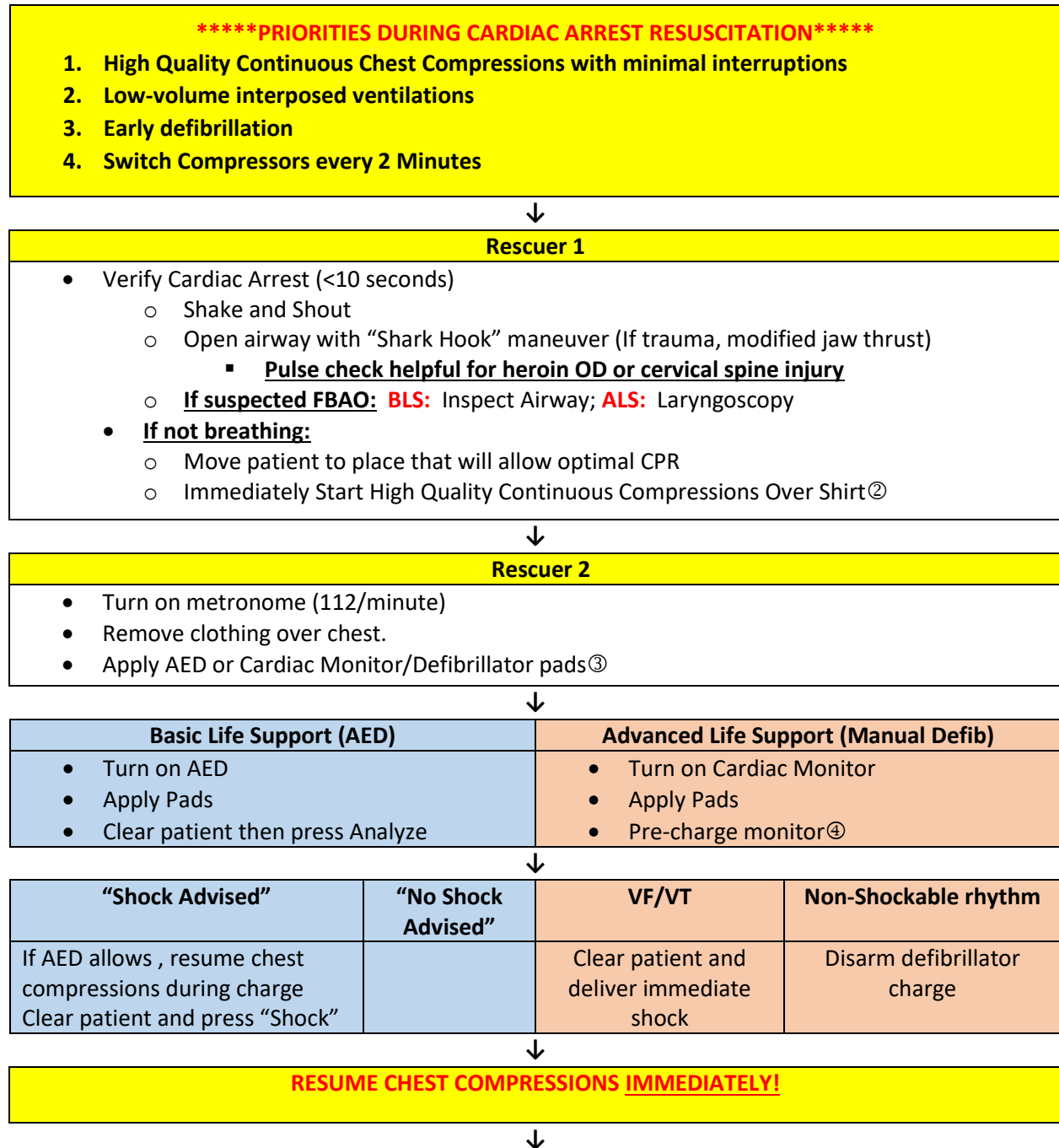
IV. PROCEDURE  
A. Arrest

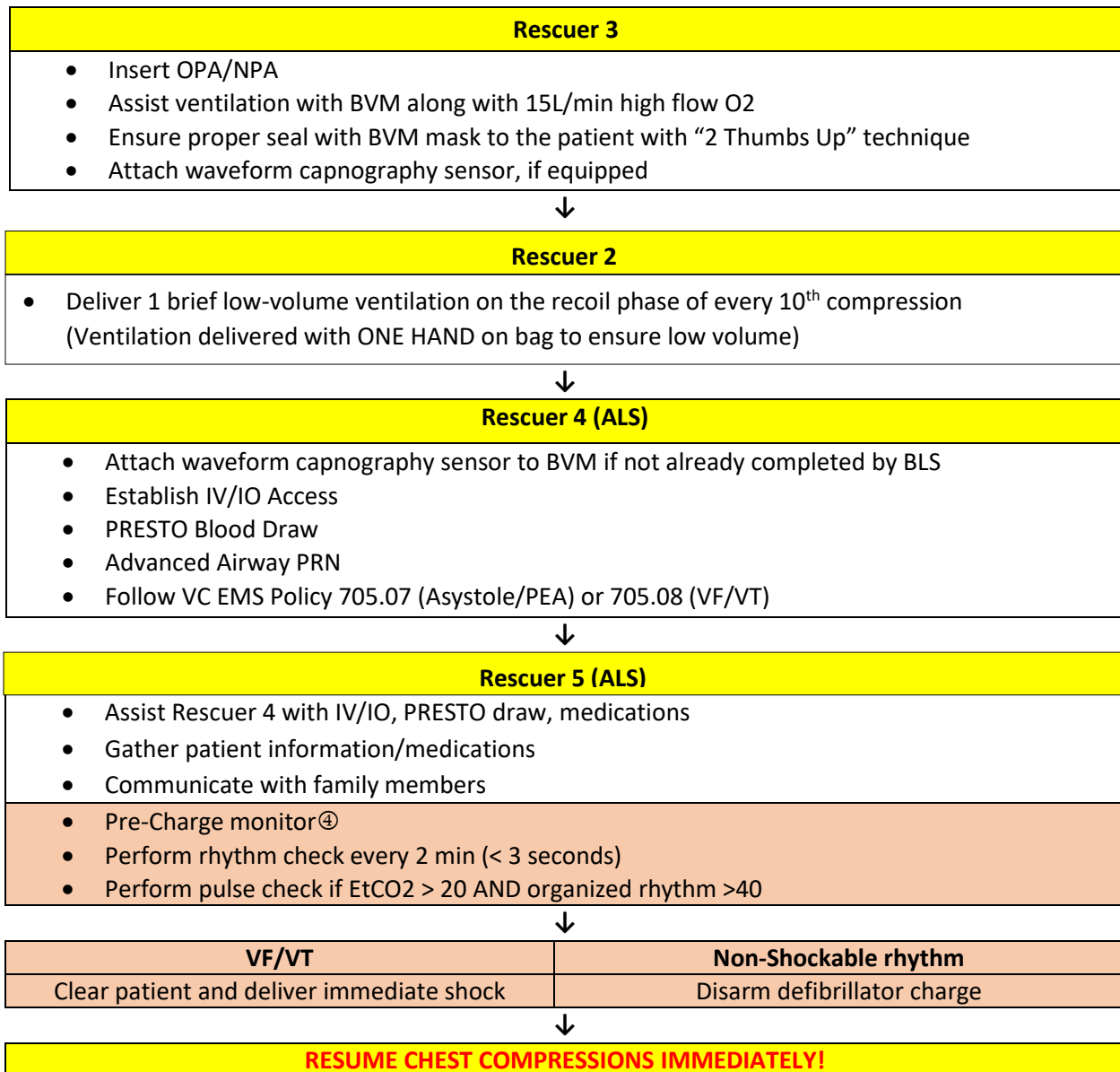


Ventura County EMS

Cardiac Arrest Management (CAM) Protocol

For patients who are in cardiac arrest and greater than 48 hours old ①

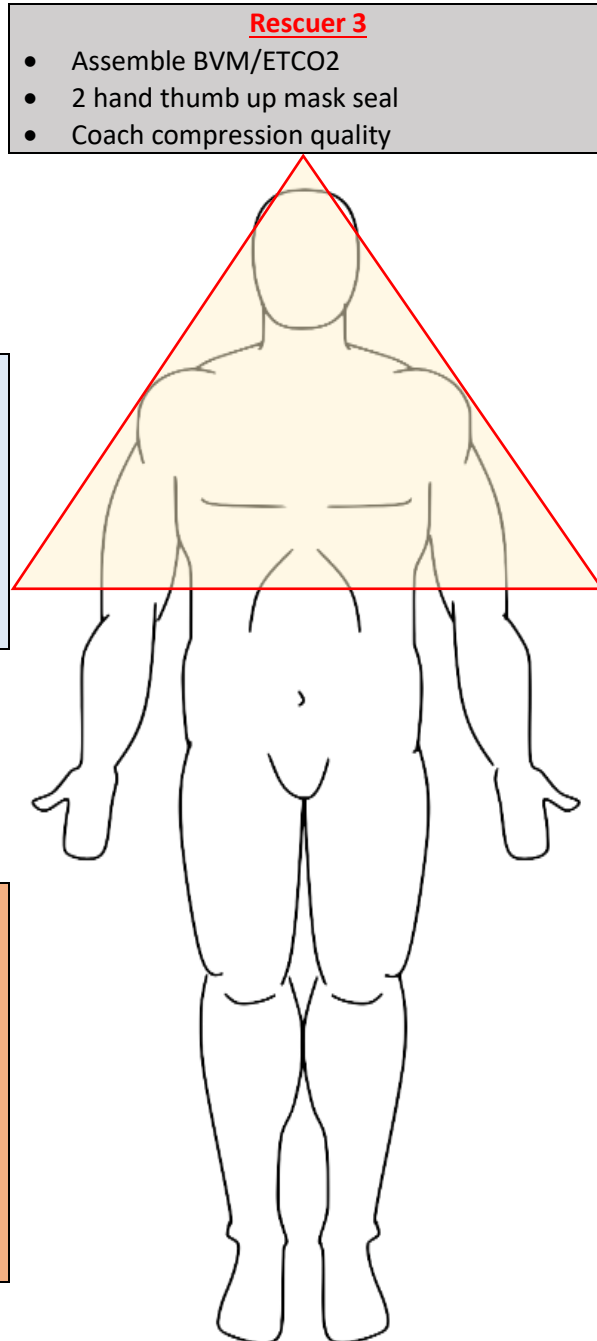




**Additional Information:**

- ① Patients less than 48 hours old will follow VC EMS Neonatal resuscitation Policy 705.16
- ② Chest Compressions:
  - Rate: 112/min
  - Depth: 2-2.4 inches for an adult
    - 1/3 the anterior-posterior chest dimension for a child or infant
  - Full chest recoil after each compression
- ③ LIFEPAK 12/15 must be in paddles mode to capture compression data
- ④ Energy level per manufacturer or provider medical director  
(If 1 or more AED shocks were delivered, ALS defibrillation at next sequential Joules setting)

## Triangle of Life Cardiac Arrest



B. Procedure – Post Arrest Resuscitation (ROSC)

**\*\*\*\*\*PRIORITIES IN POST ARREST RESUSCITATION\*\*\*\*\***

1. Immediate recognition and treatment of re-arrest
2. Preventing re-arrest through effective and continuous management of C – A – B
3. Thorough assessment and identification / treatment of correctable causes
4. Movement and transport decisions that prioritize ongoing patient care



**Rescuer 1**

- Palpate femoral pulse continuously for first 10 minutes prior to patient movement
- Immediately begin chest compressions if femoral pulse is lost or in question



**Rescuer 2**

- Continue rescue breathing
- Deliver 1 ventilation every 6 seconds, no more than 10 breaths per minute
- Deliver ventilations with ONE HAND on bag to avoid hyperventilation



**Rescuer 3**

- Ensure effective mask seal with continuous “2 thumbs up” technique
- Coach rescuer 2 as needed to assure delivery of ventilations and avoid hyperventilation
- For spontaneously breathing patients apply nasal EtCO<sub>2</sub> device, if available



**Rescuer 4  
TEAM LEAD**

- Communicate treatment priorities to team – ensure roles are clear and effective
- Setup cardiac monitor to recognize change in patient status – monitor must remain attached to patient and observed through all phases of incident
- Confirm monitor settings
  - VF alarm activated
  - Pads / paddles mode
  - SpO<sub>2</sub> waveform
  - EtCO<sub>2</sub> waveform
- Attach adhesive SpO<sub>2</sub> sensor to maintain a consistent and reliable waveform, if available
- Perform a thorough assessment: history, medications, circumstances, physical exam

May delegate interventions as appropriate

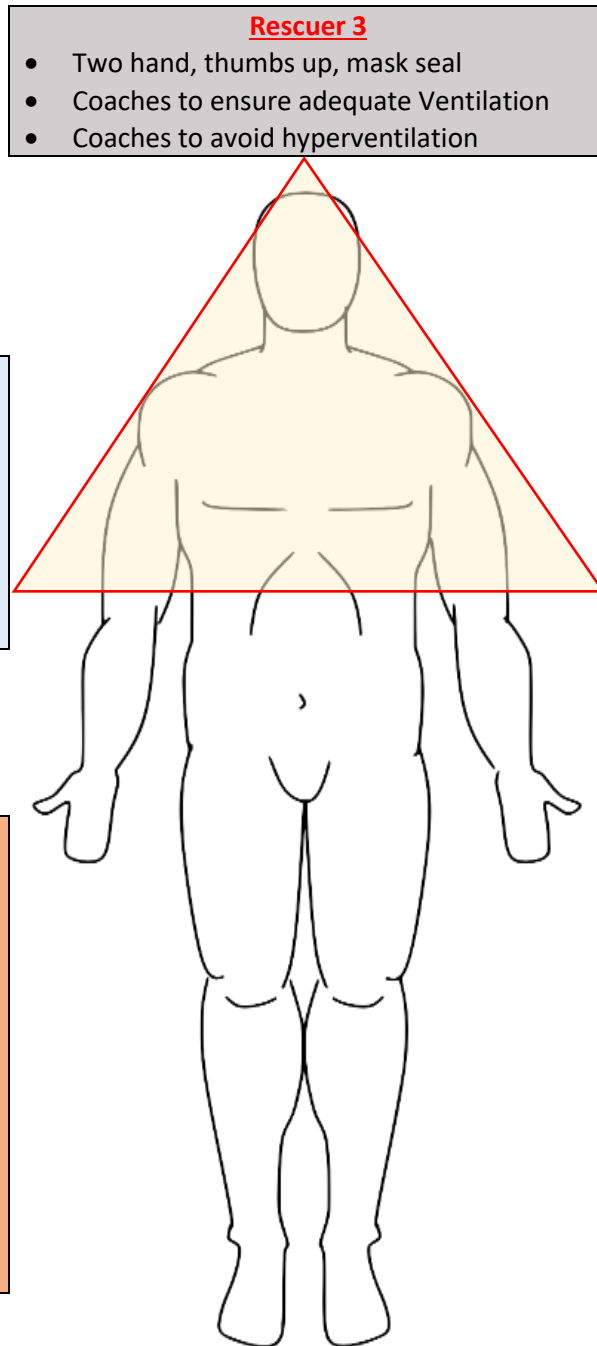
Rescuer 4 TEAM LEAD	
ASSESSMENT	
CIRCULATION	AIRWAY-VENTILATION-OXYGENATION
<ul style="list-style-type: none"> <li>Evaluate for palpable femoral pulse</li> <li>Evaluate MANUAL blood pressure                             <ul style="list-style-type: none"> <li>repeat every 5 minutes</li> <li>manual for patient changes or SBP &lt; 90 mmHg</li> </ul> </li> <li>Monitor for falling EtCO<sub>2</sub> as sign of re-arrest</li> <li>Obtain and evaluate 12 lead only after assessment and interventions</li> </ul>	<ul style="list-style-type: none"> <li>Confirm EtCO<sub>2</sub> waveform present with every ventilation; normal 35 – 45 mmHg</li> <li>Confirm presence of bilateral lung sounds</li> <li>Evaluate SpO<sub>2</sub>; goal is 94% – 99%</li> <li>Consider likelihood of respiratory cause; E.g. choking</li> </ul>
SUPPORT	
CIRCULATION	AIRWAY-VENTILATION-OXYGENATION
<ul style="list-style-type: none"> <li>Obtain peripheral IV – preferred 18g, minimum 20g</li> <li>Initiate 1 L fluid bolus, use pressure bag for IO or rapid infusion via peripheral IV</li> <li>Epinephrine 10mcg/mL                             <ul style="list-style-type: none"> <li>1mL (10mcg) every 2 minutes, slow IV/IO push</li> <li>Titrate to SBP of greater than or equal to 90mm/Hg</li> </ul> </li> <li>Circulation treatment goals                             <ul style="list-style-type: none"> <li>Peripheral pulses present</li> <li>Systolic BP &gt; 90 mmHg</li> <li>Ongoing fluid therapy**</li> </ul> </li> <li>Consider etiology to direct treatment where possible                             <ul style="list-style-type: none"> <li>Hypovolemia, sepsis, GI bleeding</li> <li>MI, heart failure, idiopathic electrical anomaly</li> <li>Hyperkalemia</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Place advanced airway as needed to                             <ul style="list-style-type: none"> <li>Improve ventilation or oxygenation</li> <li>Protect against aspiration</li> <li>Effectively ventilate while moving</li> </ul> </li> <li>SpO<sub>2</sub> goal 94%-99% - titrate supplemental oxygen down if SpO<sub>2</sub> is 100%</li> <li>Ventilation treatment goals                             <ul style="list-style-type: none"> <li>EtCO<sub>2</sub> waveform present with each breath</li> <li>Bilateral breath sounds</li> </ul> </li> <li>Consider etiology to direct treatment where possible                             <ul style="list-style-type: none"> <li>Tension pneumothorax</li> <li>Bronchoconstriction</li> <li>Pulmonary embolus</li> <li>Upper airway obstruction</li> <li>Opiate overdose</li> </ul> </li> </ul>

Refer to VCEMS Policy 735 for additional information on preparing push dose solution  
\*\*Fluid therapy indicated unless outward indication of fluid overload or left sided heart failure



Rescuer 5
<ul style="list-style-type: none"> <li>Assist in overseeing triangle of life roles</li> <li>Assist rescuer 4 by preparing medications and equipment</li> <li>Obtain manual blood pressure</li> <li>Obtain 12-lead EKG once directed; assure monitor is returned to pads / paddles mode</li> <li>May be delegated a variety of tasks based on scope</li> </ul>

## Triangle of Life Post Arrest Resuscitation



<b>POST ARREST RESUSCITATION CHECKLIST</b>	
<input checked="" type="checkbox"/>	<b>Initial Actions</b>
<input type="checkbox"/>	Initiate 10 minute continuous femoral pulse check
<input type="checkbox"/>	Continue rescue breathing as needed
<input type="checkbox"/>	Paddles attached and EKG waveform visible
<input type="checkbox"/>	VF alarm set, SpO <sub>2</sub> and EtCO <sub>2</sub> waveforms visible
<b>Circulation</b>	
<input type="checkbox"/>	Obtain peripheral IV access (18 g preferred, 20 g minimum)
<input type="checkbox"/>	Initiate NS fluid bolus
<input type="checkbox"/>	Assess for peripheral pulses
<input type="checkbox"/>	Obtain manual blood pressure
<input type="checkbox"/>	Push dose epinephrine IN ADDITION TO fluids for systolic BP < 90 mmHg
<b>Airway / Ventilation</b>	
<input type="checkbox"/>	Assess for responsiveness and spontaneous ventilations
<input type="checkbox"/>	Assess EtCO <sub>2</sub> , lung sounds, SpO <sub>2</sub>
<input type="checkbox"/>	Maintain BLS airway or place advanced airway as indicated
<input type="checkbox"/>	Place advanced airway if needed to ventilate while moving patient
<input type="checkbox"/>	Oxygenate to SpO <sub>2</sub> 94% to 99%
<input type="checkbox"/>	Oxygen flow rate titrated to prevent SpO <sub>2</sub> 100%
<b>12 Lead EKG</b>	
<input type="checkbox"/>	Obtain 12-lead EKG only after managing C-A-B and prior to movement
<b>Prior to Moving Patient, Confirm</b>	
<input type="checkbox"/>	Patient has sustained ROSC approximately ≥ 10 minutes
<input type="checkbox"/>	C-A-B have been effectively stabilized or appropriate efforts made
<input type="checkbox"/>	Team has planned how to effectively ventilate during move
<input type="checkbox"/>	Team is prepared to recognize re-arrest: <ul style="list-style-type: none"> <li>• STOP MOVING</li> <li>• RESUME CAM ON SCENE</li> </ul>



Post Arrest Resuscitation Transport
<ul style="list-style-type: none"> <li>• Transport is indicated after a patient has sustained ROSC for approximately 10 minutes and effective efforts have been made to stabilize airway, breathing, and circulation</li> <li>• Continuous patient assessment and treatment must remain the priority during transport.</li> <li>• Recognizing hypotension, inadequate ventilation, or re-arrest, will have a large impact on patient outcome.</li> </ul>

Re-Arrest Guidelines (Loss of ROSC)	
<ul style="list-style-type: none"> <li>• Re-arrests require the same high-quality CAM and ALS care as the initial arrest:               <ul style="list-style-type: none"> <li>○ Remain on scene</li> <li>○ Ensure adequate workspace</li> <li>○ Begin CAM Procedure</li> <li>○ Defibrillate VF / VT ASAP</li> </ul> </li> <li>• Provide an additional 20 minutes of high-quality CAM prior to any further movement or initiating transport.</li> <li>• If ROSC is obtained again, reassess, stabilize C – A – B as indicated, then continue with previous transport plan.</li> <li>• If no ROSC, or multiple re-arrests, through 20 minutes from initial re-arrest consider underlying cause, circumstances, and presentation, then contact base for consultation.</li> </ul>	
Prioritizing Care in Re-Arrest	
Re-Arrest On Scene	Re-Arrest During Transport
<ul style="list-style-type: none"> <li>• If re-arrest occurs during movement to gurney or ambulance, resume CAM on scene outside of ambulance</li> <li>• If re-arrest occurs after loading but prior to leaving scene, unload patient from ambulance, resume CAM, and move to workable space</li> </ul>	<ul style="list-style-type: none"> <li>• Prioritize immediate and continuous chest compressions</li> <li>• Prioritize immediate and q 2 min defib for VF/VT</li> <li>• Reassess patient considering correctable causes and previous interventions</li> <li>• Confirm advanced airway effective and in place if air-Q or ETT was used</li> </ul>
<p>NOTE: Most re-arrests occur in the first 10 minutes after ROSC is achieved. Most delayed identification of re-arrest occurs during movement of the patient and during transport.</p>	

<b>NO ROSC - NO ROSC AFTER RE-ARREST - FREQUENT RE-ARREST</b>		
<b>Base Consultation</b>		
<ul style="list-style-type: none"> <li>• Base consultation is indicated when considering DOD vs continuing resuscitation.</li> <li>• Assessment findings, observations, and clinical circumstances should be clearly communicated during base hospital consultation.</li> <li>• Direct consultation with base hospital physician is recommended in cases where the clinical scenario may warrant prolonged resuscitation or “early” termination of resuscitation.</li> </ul>		
<b>Patient Factors</b>	<b>Base Consult Takes Place</b>	<b>DOD</b>
<ul style="list-style-type: none"> <li>• Asystole / PEA</li> <li>• Never defibrillated, no shockable rhythm observed</li> </ul>	After 20 minutes of resuscitation efforts	Consider after 20 minutes; base consult
<ul style="list-style-type: none"> <li>• VF / VT</li> <li>• Defibrillated at least once during arrest</li> </ul>	After 40 minutes of resuscitation efforts without ROSC	Consider after 40 minutes; base consult
<ul style="list-style-type: none"> <li>• Bystander witnessed collapse</li> <li>• EMS witnessed collapse or loss of pulse</li> </ul>	After 40 minutes of resuscitation efforts without ROSC	Consider after 40 minutes; base consult
<ul style="list-style-type: none"> <li>• Signs of survivability               <ul style="list-style-type: none"> <li>○ EtCO<sub>2</sub> &gt; 30</li> <li>○ Spontaneous breathing attempts</li> <li>○ Spontaneous movement</li> <li>○ Frequent / persistent VF / VT</li> </ul> </li> </ul>	After 40 minutes of resuscitation efforts without ROSC	Consider DOD after 40 minutes; base consult  Physician consult preferred
<ul style="list-style-type: none"> <li>• Re-arrest without ROSC</li> <li>• Frequent re-arrest</li> </ul>	After 20 minutes of re-arrest, or 20 minutes of intermittent ROSC	Consider after base consult Consider rhythm and signs of survivability