### Procedures / Interventions

**Non-resuscitation Situations:**
- Resuscitation should not be initiated in the following situations:
  - Prolonged arrest as evidenced by lividity in dependent parts, rigor mortis, tissue decomposition, or generalized body cooling (excluding hypothermia).
  - Anytime a valid, recognized, Out-of-Hospital Advance Directive is presented (see Appendix D).
  - Resuscitation efforts pose a danger to the health/safety of responders.

**Trauma and Cardiac Arrest:**
- Resuscitation may be withheld on any traumatic arrest patient if:
  - The patient has sustained an obvious mortal injury, or
  - The patient lacks essential vital signs (pulse, respirations, pupillary reflex) and presents in asystole or PEA (or AED gives a "no shock advised" message).
- Once initiated, resuscitation may be terminated without contacting Medical Control for a trauma patient unable to maintain vital signs. Resuscitation should not be discontinued once the transport phase has begun. Patients should be transported to the closest trauma center that is not out-of-service.

**Cardiac Arrest Patient Presenting with Valid, Recognized Advance Directive (see Appendix D):**
- Resuscitation should not be initiated.
- Resuscitation should be discontinued once presented with an Advance Directive.
- Resuscitation should be initiated if:
  - There is any reason to doubt the validity of the Advance Directive
  - Any family member or legal guardian insists on emergency care

**Exceptional Resuscitation Situations:**
- An exceptional resuscitation situation occurs when a patient in cardiac arrest does not wish to be resuscitated as determined by:
  - Advance Directive not found in Appendix D: Out-of-Hospital Advance Directives or
  - Request of family, caregiver or legal guardian
- While requesting orders from Medical Control to discontinue resuscitation efforts, resuscitation should be initiated.
- Contact Medical Control to request that resuscitation efforts be terminated. Provide:
  - Advance directive form or expressed desires
  - Pre-existing medical conditions
  - Assessment findings
  - Treatment initiated

**Peri-arrest Patient Presenting with Valid Advance Directive (See Appendix D):**
- This patient will receive appropriate interventions and treatment with the following caveats:
  - Be considerate about performing heroic measures of resuscitation, especially invasive procedures.
  - Consult with patient and caregivers to understand previously expressed desires to limit care.
  - Refer to Comfort Care Protocol if appropriate
  - Advanced airway.
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<tr>
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<tbody>
<tr>
<td><strong>Documentation of Limitations to Resuscitation:</strong></td>
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<tr>
<td>• Carefully document assessment/situation findings that determined criteria for non-resuscitation.</td>
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<tr>
<td>• When an Advance Directive is honored, limitations in care should be clearly documented in the patient care report and the Directive form should be filed with the report at the EMS agency.</td>
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<tr>
<td><strong>Suspected Sudden Infant Death Syndrome (SIDS) and Infant Death Notification:</strong></td>
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<tr>
<td>• Families who suffer the sudden, unexpected death of an infant can be supported in their grief through the assistance of SIDS Resources, Inc., a non-profit institution. A Chaplain and/or on scene Chief Officer can assist responders with notification of SIDS Resources. Contact should be made before the end of your shift.</td>
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<tr>
<td><strong>Cardiac Arrest when Resuscitation is Indicated:</strong></td>
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<tr>
<td>• Initiate treatment in accordance with <em>Appendix H: Adult Cardiac Arrest Protocol</em> if indicated and utilize AED in accordance with <em>Appendix A: AED Protocol</em>.</td>
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</table>
| • Utilize the Adult or Pediatric Cardiac Arrest Checklist  
  ➢ Utilize the Adult Cardiac Arrest Checklist for adults and any pediatric patients whose height exceeds the length based tape system  
  ➢ Utilize the Pediatric Cardiac Arrest Checklist for any pediatric patients who is able to be measured by the length based tape system. | | | | |
| • When utilizing a mechanical compression device for chest compressions, application should not cause delay in providing chest compressions  
  ➢ Mechanical compression device may be applied after 20 minutes of resuscitation if available. However, exceptional circumstances may warrant earlier application. | | | | |
| • Upon arrival of ALS providers:  
  ➢ Determine rhythm using monitor/therapy electrodes.  
  ➢ Monitoring leads should be applied after monitor/therapy cables have been utilized.  
  ➢ When BVM is utilized, monitor ETCO2 | | | | |
| • Defibrillation guidelines:  
  ➢ All electrical therapy is to be administered at 200 J or at the clinically equivalent biphasic energy level.  
  ➢ Do not delay defibrillation when indicated to perform other procedures. | | | | |
### Procedures / Interventions

- **Double sequential defibrillation**: may be considered in adults **AFTER** 5 unsuccessful single defibrillations (AED shocks count toward total) and at least one dose of epinephrine and one dose of anti-arrhythmic are administered.

Identify the underlying rhythm and consider possible causes such as hypovolemia, hypoxia, cardiac tamponade, tension pneumothorax, hypothermia, massive pulmonary embolism, drug overdose, hyperkalemia, hypokalemia, acidosis, or massive AMI. During compressions, consider the following treatments for possible reversible causes of cardiac arrest:

- Assess blood glucose and treat according to the *Hypoglycemia and Hyperglycemia Protocol*.
- Chest decompression for treatment of a suspected tension pneumothorax.

- **Fluid challenge** and repeat x1 PRN

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<tbody>
<tr>
<td><strong>Double sequential defibrillation</strong></td>
<td><strong>AEMT</strong></td>
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<tr>
<td><strong>Fluid challenge and repeat x1 PRN</strong></td>
<td>Adult <em>Fluid challenge</em>: NS 500 mL</td>
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<td>Peds <em>Fluid challenge</em>: ≥ 1 mo: NS 20 mL/kg; &lt; 1 mo: NS 10 mL/kg</td>
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<tr>
<td><strong>Calcium chloride</strong> (PEA, wide complex tachycardia, and Asystole) with suspected hyperkalemia. (Note: Calcium chloride is contraindicated in VF)**</td>
<td>Adult <em>calcium chloride</em>: 1 g slow IV/IO</td>
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<tr>
<td><strong>Naloxone</strong> and repeat x 1 PRN in 5 minutes</td>
<td>Adult <em>Naloxone</em>: 0.5-2 mg IV/IO/IM/Intranasal (max total dose of 4 mg)</td>
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<tr>
<td></td>
<td>Peds <em>Naloxone</em>: 0.5-2 mg IV/IO/IM/Intranasal (max total dose of 4 mg)</td>
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### Procedures / Interventions

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<tbody>
<tr>
<td><strong>Sodium bicarbonate</strong> for known pre-existing metabolic acidosis, pre-dialysis patient or known TCA overdose.</td>
<td>Adult <strong>bicarb:</strong> 1 mEq/kg IV/IO</td>
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<td></td>
<td><strong>Peds bicarb:</strong> 1 mEq/kg IV/IO</td>
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- **Hydroxocobalamin** for patients with suspected acute cyanide poisoning

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<tr>
<td>Adult <strong>Hydroxocobalamin:</strong> 5 g IV/IO infusion</td>
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<tr>
<td><strong>Peds</strong> <strong>Hydroxocobalamin:</strong></td>
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<td>Pt wt up to 18kg: 1.25g (1/4 btl)</td>
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<td>Pt wt 19kg - 36kg: 2.5g (1/2btl)</td>
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<tr>
<td>Pt wt &gt;36kg: 5 g (1 btl)</td>
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### Ventricular Fibrillation or Pulseless Ventricular Tachycardia:

- **Adult:** Defibrillate with a single shock at 200 J followed by two minutes of chest compressions. If indicated, defibrillate and then follow the same pattern of 2 minutes of compressions between each shock.
- **Double sequential defibrillation:** can be considered **AFTER** 5 unsuccessful single defibrillations (AED shocks count toward total) and at least 1 dose of epinephrine, and 1 dose of an anti-arrhythmic have been administered.

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<thead>
<tr>
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<tbody>
<tr>
<td><strong>Adult Epi:</strong> 1 mg IV/IO (1:10,000)</td>
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<tr>
<td><strong>Peds Epi:</strong> 0.01 mg/kg IV/IO (1:10,000)</td>
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# Cardiac Arrest & Resuscitation

## Procedures / Interventions

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<tbody>
<tr>
<td><strong>Amiodarone</strong>&lt;br&gt;Antiarrhythmics will be given for patients in Refractory V-fib or pulseless V-tach which is defined as &quot;ventricular fibrillation or pulseless V tach that persists or recurs in a patient who has received a total of 2 shocks, compressions, and at least one dose of epinephrine.&quot;</td>
<td>Adult amiodarone:&lt;br&gt;300 mg IV/IO, repeat x1 at 150 mg in 5 min</td>
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<td>Peds amiodarone:&lt;br&gt;5 mg/kg IV/IO, repeat x1 in 5 min</td>
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<tr>
<td><strong>Lidocaine</strong>&lt;br&gt;Antiarrhythmics will be given for patients in Refractory V-fib or pulseless V-tach which is defined as &quot;ventricular fibrillation or pulseless V tach that persists or recurs in a patient who has received a total of 2 shocks, compressions, and at least one dose of epinephrine.&quot;</td>
<td>Adult lidocaine:&lt;br&gt;1 - 1.5 mg/kg IV/IO, repeat x1 PRN in 5 min</td>
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<td></td>
<td>Peds lidocaine:&lt;br&gt;1 – 1.5 mg/kg IV/IO, repeat x1 PRN in 5 min</td>
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<tr>
<td><strong>Magnesium sulfate</strong> for torsades de pointes</td>
<td>Adult mag sulfate:&lt;br&gt;2 g IV/IO push</td>
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## Pulseless Electrical Activity (PEA):

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<tbody>
<tr>
<td><strong>Epinephrine</strong> every 3-5 minutes</td>
<td>Adult Epi:&lt;br&gt;1 mg IV/IO (1:10,000)</td>
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<tr>
<td><strong>Consider transcutaneous pacing</strong> for suspected drug overdose</td>
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Procedures / Interventions

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<tr>
<td>• Confirm lead placement and rhythm with a second lead. If there is a question of fine VF, treat as VF</td>
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<tr>
<td>• Epinephrine every 3-5 minutes</td>
<td>Adult Epi: 1 mg IV/IO (1:10,000)</td>
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<tr>
<td></td>
<td>Peds Epi: 0.01 mg/kg IV/IO (1:10,000)</td>
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Criteria to Continue Resuscitation and transportation:
- Once resuscitation is initiated, the only cardiac arrest patients who should be transported are those:
  - Pregnant in their 2nd or 3rd trimester (immediate transport with lateral uterine displacement)
  - Without IV or IO access
  - Without adequate oxygenation or ventilation as described in IPAP
  - With return of spontaneous circulation at any point during resuscitation
  - With v-fib or v-tach refractory to appropriate interventions
  - With extenuating circumstances, including, but not limited to:
    - Family member or legal guardian insists on continued resuscitation through transport to ED
    - Non-traumatic cardiac arrest in a public place
    - Special resuscitation circumstances (hypothermia, electrocution/lightning, ventricular assist device present etc.)
    - Providers feel that the patient needs to be transported for any reason
    - Adult Only: A mechanical CPR device may be applied and continued throughout the transport

Out-of-hospital Termination of Resuscitation (Non-traumatic Cardiac Arrest):
- Use the Termination of Resuscitation Checklist
- Discontinuation of resuscitative efforts may be implemented without Medical Control contact if ALL of the following criteria have been met in a WITNESSED ARREST:
  - Adequate EMS provider chest compressions were administered
  - Adequate oxygenation or ventilation as described in IPAP
  - ETCO2 < 10 mm Hg
  - IV or IO access has been achieved
  - Defibrillation and rhythm appropriate medication have been administered according to protocol
  - 5 minutes has lapsed since last dose of Epinephrine
  - No ROSC at any point in the arrest
  - No persistently recurring or refractory v-fib/v-tach or any continued neurological activity (such as eye opening or motor responses)
  - Persistent asystole or agonal rhythm is present and no reversible causes are identified
  - A minimum of 40 minutes of EMS resuscitation has occurred.
  - If the patient is a minor, the parent/guardian is agreeable to discontinuing efforts.
Procedures / Interventions

• Discontinuation of resuscitative efforts may be implemented without Medical Control contact if **ALL** of the following criteria have been met in a **UNWITNESSED ARREST**:
  - Adequate EMS provider chest compressions were administered
  - Adequate oxygenation or ventilation as described in IPAP
  - ETCO2 < 10 mm Hg
  - IV or IO access has been achieved
  - Defibrillation and rhythm appropriate medication have been administered according to protocol
  - 5 minutes has lapsed since last dose of Epinephrine
  - No ROSC at any point in the arrest
  - No persistently recurring or refractory v-fib/v-tach or any continued neurological activity (such as eye opening or motor responses)
  - Persistent asystole or agonal rhythm is present and no reversible causes are identified
  - A minimum of **25** minutes of appropriate professional EMS resuscitation has occurred.
  - If the patient is a minor, the parent/guardian is agreeable to discontinuing efforts.

• **Note:** The following criteria may result in a higher likelihood of ROSC. If any of the following criteria are present, consider continuation of aggressive resuscitative efforts, transport, or Medical Control contact for advice.
  - Arrest was witnessed by either bystanders or EMS personnel
  - Adequate bystander chest compressions were provided
  - Public AED shocks were delivered
  - Refractory v-fib/v-tach
  - Persistently elevated ETCO2 readings

**Scene Management During Termination of Resuscitation:**

• Providers should be prepared to:
  - Address and support the surviving friends and relatives during the decision to terminate
  - Transfer care from the deceased to surviving friends and relatives and to ensure open communication and support during post-termination period
  - Ensure that a law enforcement agency is present to process legal issues and notify Coroner.
  - Consult with law enforcement agency to determine if an autopsy will be performed. Disposable resuscitation items should remain in/attached to patient if there will be an autopsy or if law enforcement is unsure if an autopsy will be performed. Otherwise, with their agreement, these items may be removed.
  - Assist, as needed, with contacting other family members, clergy, or support persons
  - Assist on-scene authorities with movement of patient within the scene.
  - Assist with notification of death to patient's Primary Care Physician or representative.