

Bayfield-Ashland Counties EMS RESUSCITATION	R-1 CARDIAC ARREST
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SYMPTOMS: Pulseless patient

**Assessment:** Once a patient is determined to be pulseless, treatment should be initiated immediately. Any further history must be obtained from bystanders while treatment is ongoing.

**Exclusion criteria:**

1. Patients suffering cardiac arrest due to severe hypothermia. (See [Hypothermia/Cold Exposure guideline \[EE-7\]](#)).
2. Patients with identifiable Do Not Resuscitate (or equivalent such as POLST) order. (See [Do Not Resuscitate Status/Advance Directive/Health Care Power of Attorney \(POA\) Status guideline \[R-3\]](#)).
3. Patients in arrest due to traumatic etiology. (See [General Trauma Management guideline \[T-1\]](#)).

**PEDIATRIC CONSIDERATIONS**

1. Airway management may be considered early given that respiratory issues are the most likely cause of cardiac arrest in children.
2. Timely initiation of compression/ventilation CPR to maintain perfusion: Single rescuer at ratio of 30:2; multiple rescuers at ration of 15:2.

**Treatment and Interventions**

**ALL EMS LEVELS**

1. Check for DNR bracelet or indications to withhold CPR.
2. Begin high quality continuous chest compressions CPR:
  - a. Compression rate – 100-120/min
  - b. Compression Depth – at least 2 inches
  - c. Allow complete chest recoil between compressions
  - d. Switch compressors at least every 2 minutes (about 200 compressions).
3. Call for ALS intercept.
4. Administer oxygen; insert oral/nasal pharyngeal airway. Ventilate at a compression to ventilation ratio of 30:2.
5. If AED not available, pause briefly (5 seconds or less) at the end of each 2 minute cycle (200 compressions) to perform a pulse check. If a carotid pulse is present, check breathing and assist ventilations every 6 seconds as needed.
6. If AED available, complete 200 high quality chest compressions (2 minutes) BEFORE attaching the AED. Attach the AED during the last 10 seconds of the 200 chest compressions.
  - a. Turn on the AED and follow voice prompts.
  - b. Attach pads to patient – right upper and left lower chest. Do not interrupt chest compressions.
  - c. When prompted, stop chest compressions for the AED to analyze. All contact with patient must be avoided during analysis of rhythm.
    - i. Shock advised
      1. Assure no responder/bystander contact with patient.
      2. Immediately deliver shock and document patient response.
      3. Resume 2 minutes of chest compressions.
    - ii. No shock advised – immediately resume chest compressions

**EMR-O; EMT-R**

7. Insert non-visualized airway. (See [Airway Management guideline \[RP-1\]](#))
  - a. Confirm placement.
  - b. Ventilate patient at a rate of not more than 10 breaths per minute delivered over one second.

- c. All attempts at airway management should be done without interrupting chest compressions.
- 8. Continue resuscitation efforts on scene until one of the following occurs:
  - a. If ALS is en-route, continue resuscitation efforts on scene until ALS arrives.
  - b. If automatic compression assist device is available and an ALS unit NOT en-route, or proximity to the hospital is closer than the inbound ALS unit, continue resuscitation efforts on scene until the 5<sup>th</sup> rhythm analysis, then coordinate movement to the ambulance and transport.
- 9. If no device is available and an ALS unit is not en-route or proximity to the hospital is closer than the inbound ALS unit, continue resuscitation efforts on scene until the 10<sup>th</sup> rhythm analysis and then initiate transport.
- 10. Manual chest compressions are less effective during patient movement and transport.
- 11. If delaying transport would benefit the patient, document circumstances on the patient care record.
- 12. If at any time during this period of resuscitation the patient regains Return of Spontaneous Circulation (ROSC), treat per [Adult Post-ROSC Care guideline \[R-4\]](#).
- 13. If resuscitation remains ineffective, consider termination of resuscitation. (See [Termination of Resuscitative Efforts guideline \[R-5\]](#)).

EMT-O

- 14. Monitor EtCO<sub>2</sub> with the target of maintaining greater than 93% saturation.

AEMT-R

- 15. Consider additional interventions for the following:
  - a. Hypovolemia: [Adult: Normal saline 2 L IV; Pediatric: 20 mL/kg; repeated up to 3 times for pediatrics.

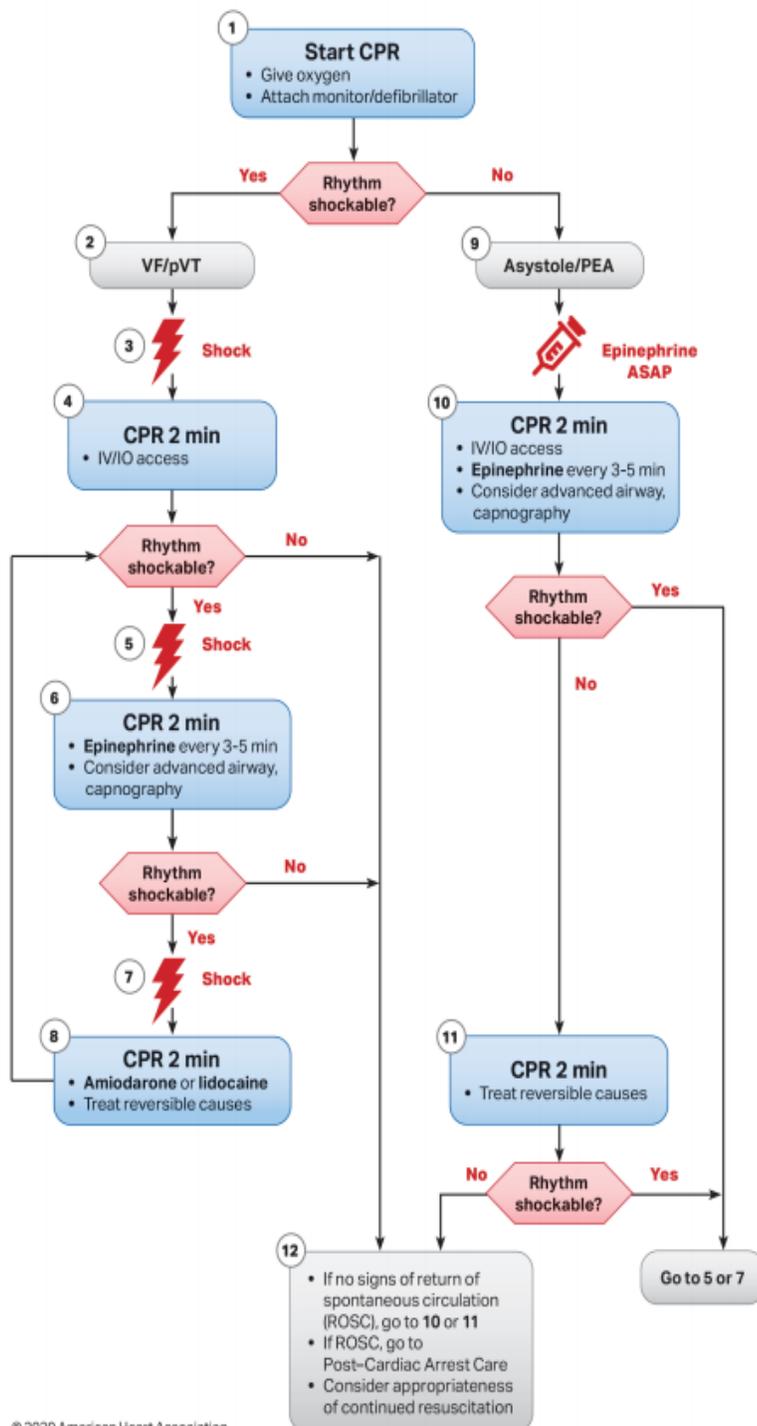
INT-R

- b. If patient is intubated at time of arrest, assess for tension pneumothorax and misplaced ETT (endotracheal tube).
- c. If tension pneumothorax suspected, perform needle decompression.
- d. Assess ETT. If misplaced, remove and replace ETT.

PARA-R

- e. If dialysis/known hyperkalemic patient, consider the following:
  - i. Calcium gluconate (preferred) [3 grams IV/IO push over 2 mins]
  - ii. Sodium bicarbonate [1mEq/kg IV/IO max 50mEq bolus]
- f. Tricyclic antidepressant overdose: Addition to care includes sodium bicarbonate [1mEq/kg IV/IO max 50mEq bolus].
- 16. If at any time during this period of resuscitation the patient regains return of spontaneous circulation, treat per [Adult Post-ROSC Care guideline \[R-4\]](#).
- 17. If resuscitation remains ineffective, consider termination of resuscitation. (See [Termination of Resuscitative Efforts guideline \[R-5\]](#)).

Figure 4. Adult Cardiac Arrest Algorithm.



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CPR Quality
<ul style="list-style-type: none"> <li>• Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.</li> <li>• Minimize interruptions in compressions.</li> <li>• Avoid excessive ventilation.</li> <li>• Change compressor every 2 minutes, or sooner if fatigued.</li> <li>• If no advanced airway, 30:2 compression-ventilation ratio.</li> <li>• Quantitative waveform capnography                             <ul style="list-style-type: none"> <li>– If PETCO<sub>2</sub> is low or decreasing, reassess CPR quality.</li> </ul> </li> </ul>
Shock Energy for Defibrillation
<ul style="list-style-type: none"> <li>• <b>Biphasic:</b> Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.</li> <li>• <b>Monophasic:</b> 360 J</li> </ul>
Drug Therapy
<ul style="list-style-type: none"> <li>• <b>Epinephrine IV/IO dose:</b> 1 mg every 3-5 minutes</li> <li>• <b>Amiodarone IV/IO dose:</b> First dose: 300 mg bolus. Second dose: 150 mg.</li> <li>or</li> <li>• <b>Lidocaine IV/IO dose:</b> First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.</li> </ul>
Advanced Airway
<ul style="list-style-type: none"> <li>• Endotracheal intubation or supraglottic advanced airway</li> <li>• Waveform capnography or capnometry to confirm and monitor ET tube placement</li> <li>• Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions</li> </ul>
Return of Spontaneous Circulation (ROSC)
<ul style="list-style-type: none"> <li>• Pulse and blood pressure</li> <li>• Abrupt sustained increase in PETCO<sub>2</sub> (typically ≥40 mm Hg)</li> <li>• Spontaneous arterial pressure waves with intra-arterial monitoring</li> </ul>
Reversible Causes
<ul style="list-style-type: none"> <li>• Hypovolemia</li> <li>• Hypoxia</li> <li>• Hydrogen ion (acidosis)</li> <li>• Hypo-/hyperkalemia</li> <li>• Hypothermia</li> <li>• Tension pneumothorax</li> <li>• Tamponade, cardiac</li> <li>• Toxins</li> <li>• Thrombosis, pulmonary</li> <li>• Thrombosis, coronary</li> </ul>