# CARDIAC ARREST

## ALL PROVIDERS / EMT

*For Traumatic Arrest refer to General Trauma Management Guidelines*

- ❑ Focused history and physical exam
  - Assess for evidence that resuscitation should not be attempted per the ***Death Determination and Termination of Resuscitation Guideline***.
- ❑ Continuous ECG, ETCO2, 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
      - Precharge the defibrillator and countdown to rhythm check/defibrillation
      - Use a verbal 5 second countdown during any pause to limit hands-off time
    - Rate: 100-120/min
    - Depth: 2-2.5 inches (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 rhythm/pulse
    - Rotate compressors every 2 minutes
    - If using mechanical CPR:
      - Apply device with minimum interruption in CPR
      - Check rhythm/pulse every 2 min (5 seconds only, use a verbal countdown)
      - Duration of resuscitation as below
  - 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
    - Treatment of the adult cardiac arrest patient in the field is preferred in the majority of cases and is associated with improved outcomes
    - Assume cardiac origins for all adult arrests unless evidence to the contrary. Consider underlying causes and treat when possible.
    - Duration of resuscitation. Consider prolonged attempts in patients with an initial shockable rhythm and a witnessed collapse
    - Initial shockable/PEA rhythms: <1% survival after 40 minutes of resuscitation attempt
    - Initial Asystole: <1% survival after 20 minutes of resuscitation attempt
  - **H's & T's** - Treat as appropriate with confirmed or suspected Hypovolemia, Hypoxia, Hydrogen ion (Acidosis), Hyperkalemia, Hypothermia, Hypoglycemia, 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 in the ED, which may save the fetus and is associated with maternal survival.

❑ Pediatric Population
- Consider transport in pediatric arrest after 15 minutes of field resuscitation, including high-quality CPR, effective ventilations, and IV/IO access
- 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

❑ **AED**
- Defibrillate immediately if AED advises shock.
- Resume CPR immediately after each shock and continue for 2 minutes
- Check pulse and repeat shock if prompted by AED

❑ **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 *or* use a 30:2 compressions to ventilations ratio

❑ **Unwitnessed arrest or evidence of a non-cardiac cause**: Apply asynchronous BVM breaths at a rate of 1 breath every 6-8 seconds *or* use a 30:2 compressions to ventilations ratio

### AEMT

**ALL RHYTHMS**
- Begin CPR, as above

❑ Vascular access and fluid therapy

❑ Consider placement of a supraglottic device after 2-3 cycles of CPR/defibrillation without interrupting CPR

❑ **Epinephrine:** 1 mg (10 ml of 0.1 mg/ml/1:10,000) IV/IO push every 3-5 min as long as the patient remains pulseless.
- Unless a clear response to epinephrine is observed, consider a ***limit of 3 total doses***.

❑ Consider NS 1000 mL IV/IO bolus if hypovolemia suspected

## PEDIATRIC (<15 years of Age)

**NOTE: Pediatric weight based dosing should not exceed adult dosing.**

### EMT

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

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

### AEMT

**ALL RHYTHMS**
- Begin CPR, as above

❑ BVM, supraglottic airway, vascular access and fluid therapy.

❑ **Epinephrine: 0.01 mg/kg** (0.1 mg/ml / 1:10,000) IV/IO every 3-5 min as long as the patient remains pulseless.
- Max dose = 1 mg (10 ml)
- Unless a clear response to epinephrine is observed, consider a limit of 3 total doses.
- Consider NS 20 ml/kg IV/IO bolus if hypovolemia suspected, reassess and repeat if needed to a Max of 60 mL/kg

**SHOCKABLE RHYTHM (VF/VT) PRESENT**

- ❑ **Defibrillation**
- ❑ **360J** for a monophasic defibrillator or **120-360J** for a biphasic, with escalating energy for subsequent shocks (Follow manufacturer's recommendations)
- ❑ Resume CPR immediately after shock and continue for 2 minutes
- ❑ Check rhythm and pulse every 2 min
- ❑ **Anti-arrhythmics are indicated for shockable rhythms that are unresponsive to defibrillation**
  - May administer either **ONE** of these anti-arrhythmics:
    - **Amiodarone** 300 mg IV/IO, second dose is 150 mg IV/IO after 5 min
    - **Lidocaine** 1 mg/kg IV/IO/ET. May repeat every 3-5 min up as needed up to 3 mg/kg.
      - Follow with continuous infusion (1 to 4 mg/minute) after return of perfusion.

✆ Contact OLMC before terminating resuscitative efforts in the field

**PARAMEDIC**

**ALL RHYTHMS**

- ❑ May consider endotracheal intubation, if unable to adequately ventilate with BVM (preferred) or supraglottic airway, ***per Airway and Tracheostomy Management Guideline.***
- ❑ Intubation must not interfere with chest compressions.
- ❑ Special Circumstances
  - Known or Suspected Hyperkalemia
    - Calcium Chloride 1 gram IV/IO over 2 min. May repeat in 5 min X1 **OR** Calcium Gluconate 3 grams IV/IO over 2 min. May repeat X1.
    - Sodium Bicarbonate 1 mEq/kg IV/IO may repeat every 5 min X2
  - Polymorphic VT associated with long QT
    - Magnesium 2 gm IV/O over 2 min

✆ Contact OLMC for further orders or therapies

**SHOCKABLE RHYTHM (VF/VT) PRESENT**

- ❑ **Defibrillation**
- ❑ **2 J/kg** for the first shock with either a monophasic or biphasic defibrillator. Second and subsequent shocks increase by 2 J/kg, up to a max dose 10 J/kg
- ❑ Resume CPR immediately after shock and continue for 2 minutes
- ❑ Check rhythm and pulse every 2 min
- ❑ **Anti-arrhythmics are indicated for shockable rhythms that are unresponsive to defibrillation**
  - May administer either **ONE** these antiarrhythmics:
    - **Amiodarone** 5 mg/kg IV/IO (max 300mg/dose). May repeat 2 more times every 5 min as needed. (Total max 450mg)
    - **Lidocaine** 1 mg/kg IV/IO/ET. May repeat every 3-5 min up to 3 mg/kg.
      - Maintenance 20-50 mcg/kg/min

✆ Contact OLMC before terminating resuscitative efforts in the field

**PARAMEDIC**

**ALL RHYTHMS**

- ❑ May consider endotracheal intubation, if unable to adequately ventilate with BVM (preferred) or supraglottic airway, ***per Airway and Tracheostomy Management Guideline.***
- ❑ Intubation must not interfere with chest compressions.
- ❑ Special Circumstances
  - Known or Suspected Hyperkalemia
    - Calcium Chloride 20 mg/kg IV/IO may repeat in 10 min (max 2 grams) **OR** Calcium Gluconate 100 mg/kg IV/IO may repeat in 10 min (max 3 grams)
    - Sodium Bicarbonate 1 mEq/kg IV/IO (Max of 50 mEq). For <2 years of age use 4.2% concentration.
  - Polymorphic VT associated with long QT
    - Magnesium 50 mg/kg (Max = 2,000 mg) IV/O over 2 min

✆ Contact OLMC for further orders or therapies