VENTRICULAR FIBRILLATION / PULSELESS VENTRICULAR TACHYCARDIA
ALWAYS USE BODY SUBSTANCE ISOLATION PRECAUTIONS

INDICATION
- Pulseless, apneic with cardiac rhythm of ventricular fibrillation or wide complex tachycardia

CRITICAL INFORMATION
- Witnessed or unwitnessed
- Effective Bystander CPR

TREATMENT
- Witnessed arrest: CPR until defibrillator available
- Unwitnessed arrest: CPR for 2 minutes prior to defibrillation
- ALL arrests: CPR for 2 minutes between shocks. Do not check rhythm immediately after shock.
- If available, use mechanical CPR (contraindicated in pediatrics and traumatic arrests)
- Defibrillate as per manufacturer’s recommendations. Repeat 30-60 seconds after drug administrations
- ALS RMC
- If VF/VT converts to another rhythm post defibrillation, refer to appropriate protocol for further treatment
- If VF/VT continues: Epinephrine 1:10,000 1.0 mg IV/IO; repeat q 3-5 minutes;
- If VF/VT persists after three defibrillations or recurs:
  - Consider Amiodarone 300 mg IV/IO push (diluted in, or followed by, 20 to 30 ml NS). Initial dose can be followed by ONE 150 mg IV/IO push in 3 to 5 minutes
- If rhythm converts with return of pulses, refer to ROSC policy.
- If rhythm converts with return of pulses after Amiodarone, monitor and consider infusion of Amiodarone drip (150mg in 100 ml NS, 1 mg/minute= 40 gtts/min. with 60 drops ml/ tubing)

SPECIAL CONSIDERATIONS
- Establishment of IV/IO, airway and medication administration should occur during CPR and should not interrupt the CPR cycles
- If rhythm converts without administration of Amiodarone, monitor and transport
- Consider pre-cordial thump if witnessed and no defibrillator immediately available
- Consider and treat possible contributing factors:
  - Hypovolemia
  - Hypoxemia
  - Hydrogen ion (acidosis)
  - Hypo/Hyperkalemia
  - Hypoglycemia
  - Hypothermia
  - Toxins (overdoses)
  - Tamponade, cardiac
  - Tension pneumothorax
  - Thrombosis (coronary / pulmonary)
  - Trauma

DOCUMENTATION – ESSENTIAL ELEMENTS
- Bystander CPR
- Witnessed or unwitnessed

RELATED POLICIES / PROCEDURES
Return of Spontaneous Circulation C10
PULSELESS ELECTRICAL ACTIVITY
ALWAYS USE BODY SUBSTANCE ISOLATION PRECAUTIONS

INDICATION
- Pulseless, apneic with rhythm that includes electromechanical dissociation (EMD), pseudo-electromechanical dissociation (pseudo-EMD), idioventricular rhythms, ventricular escape rhythms and bradycardia

CRITICAL INFORMATION
- Witnessed or unwitnessed
- Effective Bystander CPR

TREATMENT
- CPR. if available, use mechanical CPR (contraindicated in pediatrics and traumatic arrests)
- ALS RMC
- Establish IV/ IO NS 250-500 ml fluid challenge then TKO
- Administer Epinephrine 1mg (1:10,000) IV/ IO. Repeat q 3-5 min.
- If hyperkalemia is suspected in renal dialysis patients, administer 500 mg of 10% Calcium Chloride and 1 mEq/kg of Sodium Bicarbonate IV/ IO
- If rhythm converts with return of pulses, refer to ROSC Policy
- If the above procedures have been completed without ROSC, consider field determination of death

SPECIAL CONSIDERATIONS
- Establishment of IV/IO, airway and medication administration should occur during CPR and should not interrupt the CPR cycles
- Consider and treat possible contributing factors:

<table>
<thead>
<tr>
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DOCUMENTATION- ESSENTIAL ELEMENTS
- Witnessed or unwitnessed
- Bystander CPR

RELATED POLICIES/ PROCEDURES
- Determination of Death ALS ATG 6
- Return of Spontaneous Circulation (ROSC) C 10
- Trauma Triage and Destination Guidelines 4613
ASYSTOLE
ALWAYS USE BODY SUBSTANCE ISOLATION PRECAUTIONS

INDICATION
- Pulseless, apneic with no electrical activity on cardiac monitor

CRITICAL INFORMATION
- Determination of death can be made immediately if all of the following are present:
  - Event was unwitnessed
  - Effective bystander CPR was not initiated
  - No AED used or manual shock applied
  - Asystole has been documented in two monitoring leads for one minute or in one lead if an AED is the only available monitor
- If all of the above criteria not met, begin treatment

TREATMENT
- CPR. If available, use mechanical CPR (contraindicated in pediatrics and traumatic arrests)
- ALS RMC
- IV/IO NS, 250-500 ml then TKO
- Epinephrine 1 mg (1:10,000) IV/IO; circulate for 2 min., check rhythm & pulse. MR q 3-5 min
- Establishment of IV/IO, airway and medication administration should occur during CPR and should not interrupt the CPR cycles.
- If hyperkalemia is suspected in renal dialysis patients, administer 500 mg of 10% Calcium Chloride and 1 mEq/kg of Sodium Bicarbonate IV/IO.
- If rhythm converts with return of pulses, refer to ROSC Policy
- Consider field determination of death if patient remains in asystole and meets Determination of Death ALS criteria

SPECIAL CONSIDERATION
- Consider and treat possible contributing factors:
  - Hypovolemia
  - Hypoxemia
  - Hydrogen ion (acidosis)
  - Hypo/Hyperkalemia
  - Hypoglycemia
  - Hypothermia
  - Toxins (overdoses)
  - Tamponade, cardiac
  - Tension pneumothorax
  - Thrombosis (coronary / pulmonary)
  - Trauma

DOCUMENTATION- ESSENTIAL ELEMENTS
- Time death was determined

RELATED POLICIES/ PROCEDURES
- Determination of Death ALS Policy ATG 6
- Return of Spontaneous Circulation C10
BRADYDYSRHYTHMIAS
ALWAYS USE BODY SUBSTANCE ISOLATION PRECAUTIONS

INDICATION
- HR < 60 with adequate or inadequate perfusion

TREATMENT
- Adequate perfusion
  - ALS RMC
  - 12-lead ECG
- Inadequate perfusion (acute altered mental status, ongoing chest pain, hypotension or other signs of shock)
  - ALS RMC
  - 12-lead ECG
  - Transcutaneous pacing for high-degree blocks (type II second-degree or third-degree)
  - Fluid bolus of 250-500 ml NS if hypotensive and lungs clear. Repeat as needed.
  - **Atropine** 0.5 mg IV/IO for first or second degree Mobitz I block, or if pacing is delayed Repeat q 5 min. to total of 3 mg.
  - If inadequate response, **Dopamine** 400 mg/250 ml pre-mixed solution. Start 10ug/kg/min. Titrate to SBP 100.

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SPECIAL CONSIDERATIONS
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  - Hypoxemia
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  - Hypo/Hyperkalemia
  - Hypoglycemia
  - Hypothermia
  - Toxins (overdoses)
  - Tamponade, cardiac
  - Tension pneumothorax
  - Thrombosis (coronary / pulmonary)
  - Trauma

DOCUMENTATION / ESSENTIAL ELEMENTS
- Time pacing started/ stopped

RELATED POLICIES/ PROCEDURES
- Adult Sedation Policy ATG 3
- External Cardiac Pacing Procedure ALS PR 11
WIDE COMPLEX TACHYCARDIA
ALWAYS USE BODY SUBSTANCE ISOLATION PRECAUTIONS

INDICATION
- Regular, wide ventricular complexes greater than 150 beats/minute, with pulses present

TREATMENT
- ALS RMC
- **Stable** (Normal mental status and/or signs of normal or mildly decreased perfusion):
  - 12-lead ECG
  - Infuse **Amiodarone** 150 mg IV/IO (add 150 mg to 100 ml of **NS** and infuse total over 10 minutes). May repeat q 10 minutes as needed.
- **Unstable** (Signs of poor perfusion: decreased LOC, SBP< 100, CHF, chest pain, SOB):
  - Synchronized cardioversion @ 100J, 200J, 300J, 360J (or biphasic equivalent)
  - If patient is conscious, consider sedation with **Midazolam** 1 mg SLOW IV/IO push loading dose; May repeat with 1-2 mg in 3 minutes to achieve desired degree of sedation (use with caution if patient is hypotensive).
  - If any delay in synchronized cardioversion and the patient is critical, defibrillate the patient.
  - If no response to cardioversion infuse **Amiodarone** 150 mg IV/IO (add 150 mg to 100 ml of **NS** and infuse total over 10 minutes). May repeat q 10 minutes as needed.
  - If rhythm converts refer to appropriate protocol for further treatment.

SPECIAL CONSIDERATION
Consider and treat possible contributing factors:

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RELATED POLICIES/ PROCEDURES
- Ventricular fibrillation/ Pulseless Ventricular Tachycardia C1
- Adult Sedation ATG 3
NARROW COMPLEX TACHYCARDIA
ALWAYS USE BODY SUBSTANCE ISOLATION PRECAUTIONS

INDICATION
 QRS < 0.12 sec. documented rhythm in two leads (if >0.12 sec., go to Wide Complex Policy)
 Includes Atrial Fibrillation, Atrial Flutter, and SVT (SVT is regular HR > 150)

TREATMENT
 ALS RMC
 Proximal vein is preferred IV site
 Stable SVT Patients (normal mental status and/or signs of normal or mildly decreased perfusion):
   Obtain 12-lead ECG
   Consider valsalsa maneuver
   If no response to valsalva:
     Adenosine 6 mg RAPID IVP followed by 20 ml saline flush
   If no response after 1 - 2 min:
     Adenosine 12 mg RAPID IVP followed by 20 ml saline flush
   Elevate the extremity after each rapid bolus
 Stable Atrial Fibrillation and Atrial Flutter:
   Obtain 12-lead ECG
 Unstable SVT/ Atrial Fibrillation/ Atrial Flutter (signs of poor perfusion: decreased LOC, BP< 100, CHF, or chest pain):
   If patient is conscious, consider sedation with Midazolam 1 mg SLOW IV/IO (use with caution if patient is hypotensive)
   Synchronized cardioversion @ 100J, 200J, 300J, 360J (or biphasic equivalent)
   If any delay in synchronized cardioversion and the patient is critical, defibrillate the patient.

SPECIAL CONSIDERATION
 Consider treating possible contributing factors:
   Hypovolemia
   Hypoxemia
   Hydrogen ion (acidosis)
   Hypo/Hyperkalemia
   Hypoglycemia
   Hypothermia
   Toxins (overdoses)
   Tamponade, cardiac
   Tension pneumothorax
   Thrombosis (coronary / pulmonary)
   Trauma

DOCUMENTATION- ESSENTIAL ELEMENTS
 12-lead ECG findings

RELATED POLICIES/ PROCEDURES
 Wide Complex Tachycardia C 6
 Adult Sedation ATG 3
CHEST PAIN/ ACUTE CORONARY SYNDROME
ALS

ALWAYS USE BODY SUBSTANCE ISOLATION PRECAUTIONS

INDICATION
- Chest discomfort or pain, suggestive of cardiac origin.
- Other symptoms of Acute Coronary Syndrome (ACS) which may include weakness, nausea, vomiting, diaphoresis, dyspnea, dizziness, palpitations, “indigestion”
- Atypical symptoms or “silent MIs” (women, elderly, and diabetics)

PHYSICIAN CONSULT
- Additional treatment for ongoing pain when BP<100

TREATMENT
- ALS RMC
- **ASA** 162-325 mg (chewable), even if patient has taken daily ASA dose
- 12-lead ECG; if elevation in leads II, III, and AVF, suspect RVI and perform right-sided ECG.
- For chest discomfort or pain, **NTG** 0.4 mg SL/ spray, MR q 5 min. if systolic BP > 100
  - Withhold the NTG if the patient has RVI or has taken erectile dysfunction (ED) medication within the last 24 hrs (Viagra/Levitra) or 36 hrs (Cialis).
- If pain persists give **Morphine Sulfate** 2-5 mg slowly IV; MR q 2-3 minutes to a total of 10 mg.
- Consider NS 250cc IV fluid bolus if BP < 100.
- For recurrent episodes of ventricular tachycardia with persistent chest pain, administer **Amiodarone** 150 mg in 100 ml NS, IV/IO; infuse over 10 minutes. May repeat q 10 minutes as needed.

SPECIAL CONSIDERATION
- IV access before NTG if any one of the following applies:
  - SBP <120
  - Patient does not routinely take NTG
- Consider other potential causes of chest pain: pulmonary embolus, pneumonia, aortic aneurysm and pneumothorax.
- Infarctions may be present with normal 12-leads.

DOCUMENTATION- ESSENTIAL ELEMENTS
- OPQRST information
- Vital signs before/after NTG administration
- Cardiac rhythm documentation
- ECG findings
- Erectile dysfunction medications taken
- Level of pain

RELATED POLICIES/ PROCEDURES
- 12-lead Electrocardiogram ALS PR 12
- Destination Guidelines GPC 4
- STEMI C 9
ST ELEVATION MYOCARDIAL INFARCTION
(STEML)

ALWAYS USE BODY SUBSTANCE ISOLATION PRECAUTIONS

INDICATION
- Patients with acute ST Elevation Myocardial Infarction (STEMI) as identified by machine read.

PHYSICIAN CONSULT
- If patient is symptomatic for STEMI, but computer interpretation is not in agreement, transmit ECG and consult the STEMI Receiving Center (SRC) receiving physician.
- If above findings occur, but transmission is not available, activate SRC with Early STEMI Notification.

TREATMENT/PROCEDURE
- ALS RMC
- Treat patient under appropriate protocol
- Determine if patient is stable or unstable, and transport to appropriate facility
- Provide Early STEMI Notification
  - If elevation in leads II, III, and AVF, suspect RVI and perform right-sided ECG.
  - To determine if patient is stable or unstable:

<table>
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<tr>
<th>Stable</th>
<th>Unstable</th>
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<tr>
<td>Stable VS and no indication of shock</td>
<td>SBP&lt; 90 (prior to NTG and Morphine Sulfate administration)</td>
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<td>Signs of acute pulmonary edema</td>
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<td>Ventricular tachyarrhythmia requiring defibrillation or antiarrhythmic therapy</td>
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<tr>
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<td>Patient’s condition, based on paramedic judgment, requires immediate hospital intervention</td>
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- Stable patient:
  - May go to preferred SRC if the estimated transport time is not more than 15 minutes further than the nearest SRC
  - Preferred SRC defined:
    - Patient preference
    - SRC used by treating cardiologist.

- Unstable patient:
  - Transport to the closest SRC
  - Transport to the closest SRC if patient has no preference / cardiologist

SPECIAL CONSIDERATION
- Early notification report to include: age, gender, symptoms (including presence or absence of chest pain), 12-lead findings.
- Transmit all STEMI ECGs to SRC if possible

DOCUMENTATION- ESSENTIAL ELEMENTS
- 12-lead findings
- How preferred SRC is determined

RELATED POLICIES/PROCEDURES
- Destination Guidelines GPC 4
- 12-lead ECG Procedure ALS PR 12
- Chest Pain / ACS C8
RETURN OF SPONTANEOUS CIRCULATION (ROSC)  
ALS  

ALWAYS USE BODY SUBSTANCE ISOLATION PRECAUTIONS

INDICATION  
- The presence of a palpable pulse and/or blood pressure after cardiac arrest

TREATMENT  
- **ALS RMC**  
  - Maintain oxygen saturation 94%-99%  
  - Perform ETCO\textsubscript{2} if available  
  - Avoid excessive ventilation. Start at 10-12 breaths/min and titrate to target ETCO\textsubscript{2} 35-40 mm Hg  
  - 12-lead ECG / Early notification if STEMI  
  - Elevate head 30° if patient is conscious  
  - If patient remains comatose, initiate therapeutic hypothermia (do not initiate if arrest is due to hypothermia)  
    - Expose patient and apply 8 ice packs: 2 to head, 1 over each carotid artery, 1 in each axillae, and 1 on each femoral artery at groin  
    - If available, rapid infusion of ice-cold IV NS at 30 ml/kg  
  - Transport to nearest available STEMI Receiving Center  
  - For BP < 90 mm Hg:  
    - NS 1-2 liter bolus (may use ice-cold fluids if inducing hypothermia); if no improvement:  
    - **Dopamine** 10 mcg/kg/min. Titrate to SBP 100

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DOCUMENTATION - ESSENTIAL ELEMENTS
- Cardiac rhythm documentation
- 12-lead findings
- Time therapeutic hypothermia initiated

RELATED POLICIES/ PROCEDURES
- 12-lead Electrocardiogram ALS PR 12
- Destination Guidelines GPC 4