VENTRICULAR FIBRILLATION/PULSELESS VENTRICULAR TACHYCARDIA
ALWAYS USE STANDARD PRECAUTIONS

START CPR
- Give O2
- Attach monitor/defibrillator
- ALS RMC

Rhythm Shockable?

VF/pVT

CPR 2 min
- IO/IV access

Rhythm Shockable?

CPR 2 min
- Epinephrine every 3-5 min
- Consider advanced airway

Rhythm Shockable?

CPR 2 min
- Amiodarone
- Treat reversible causes

Go to Policy –
- Asystole/PEA
- ROSC

Critical Information:
- Witnessed vs Unwitnessed
- Consider pre-cardial thump if witnessed and defibrillator not immediately available
- Compress at 110 bpm. Use metronome or similar device
- Mechanical CPR is mandatory during transportation
- Change compressors every 2 minutes
- Minimize interruptions
- If hypothermic <95F, delay compressions for 3 minutes; focus on ventilations and active rewarming
- Defibrillate per manufacturer’s recommendations.
- Do not stop compressions while defibrillator is charging
- Resume compressions immediately after shock

BLS Airway Management:
- BLS airway is preferred during the first 5 minutes
- Use two-person BLS airway management whenever possible
- Avoid excessive ventilation
- 30:2 compression/ventilation ratio

ALS Airway Management:
- King Airway / Video Laryngoscopy (VL)
- Laryngoscopy for ETT must occur with CPR in progress. Do not interrupt CPR for >10 seconds for tube placement
- Use continuous ETCO2 to monitor CPR effectiveness and advanced airway placement.
- Maintain O2 sat 94-99%
- 1 breath every 6 seconds

Drug Therapy:
- Epinephrine 1mg (0.1mg/ml concentration) IV/IO q 3-5 minutes
- Amiodarone first dose: 300mg IV/IO; second dose 150mg IV/IO in 3-5 minutes. If rhythm converts to ROSC after Amiodarone, consider infusion of Amiodarone drip (150mg in 100ml NS, 1mg/min = 40 gtt/min with 60 gtt/ml tubing)

Reversible Causes:
- Hypovolemia
- Hypoxia
- Hydrogen Ion (Acidosis)
- Hypo-/Hyperkalemia
- Hypothermia
- Tension Pneumothorax
- Tamponade (cardiac)
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

For refractory Vfib (3 unsuccessful shocks), transport to nearest available STEMI Receiving Center
ASYSTOLE / PULSELESS ELECTRICAL ACTIVITY
ALWAYS USE STANDARD PRECAUTIONS

Critical Information:
- Witnessed vs Unwitnessed
- Determination of death can be made immediately if all are present (Medical patients):
  - Presenting rhythm is asystole
  - Event was unwitnessed
  - Effective bystander CPR was not initiated
  - No evidence of potentially reversible cause of arrest (e.g. hyperkalemia or hypothermia)
  - No AED or manual shock delivered
- Determination of death can be made immediately if either are present (Trauma patients):
  1. MCI incident where triage principles preclude initiation of CPR
  2. Blunt, penetrating or profound multi-system trauma with asystole or PEA
- If hyperkalemia is suspected in renal dialysis patients, administer 500mg of 10% Calcium Chloride and 1 mEq/kg of Sodium Bicarbonate IV/IO
- If hypothermic <95°F, delay compressions for 3 minutes; focus on ventilations and active rewarming
- Refer to Adult Cardiac Arrest Policy

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Reversible Causes
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- Tamponade (cardiac)
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary
BRADYDYSRHYTHMIAS
ALWAYS USE STANDARD PRECAUTIONS

INDICATION
▪ HR < 50 with adequate or inadequate perfusion

 PHYSICIAN CONSULT
▪ If SBP < 80, obtain physician consult for Push-dose Epinephrine

TREATMENT
▪ Adequate perfusion
  ▪ ALS RMC
▪ Inadequate perfusion (acute altered mental status, ongoing chest pain, hypotension or other signs of shock)
  ▪ ALS RMC
  ▪ **Atropine** 0.5 mg IV/IO Repeat q 3-5 min. to total of 3 mg. (Atropine should not delay pacing for patients with inadequate perfusion).
  ▪ 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. If inadequate response
  ▪ If SBP < 80 obtain physician consult for Push-dose Epinephrine:
    ▪ Mix 1mL Epinephrine (0.1mg/mL concentration) with 9mL Normal Saline in a 10mL syringe
    ▪ Administer Push-dose Epinephrine 1mL IV/IO every 3-5 minutes
    ▪ Titrate to maintain SBP >80mmHg
    ▪ Monitor blood pressure every five minutes

SPECIAL CONSIDERATIONS
▪ 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 pacing started/ stopped

RELATED POLICIES/ PROCEDURES
▪ Adult Sedation Policy ATG 3
▪ External Cardiac Pacing Procedure ALS PR 11
WIDE COMPLEX TACHYCARDIA
ALWAYS USE STANDARD 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
    - 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:

<table>
<thead>
<tr>
<th>Hypovolemia</th>
<th>Toxins (overdoses)</th>
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</thead>
<tbody>
<tr>
<td>Hypoxemia</td>
<td>Tamponade, cardiac</td>
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<td>Hypoglycemia</td>
<td>Trauma</td>
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<td>Hypothermia</td>
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</tbody>
</table>

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 valsalva 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 STANDARD 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 Mi’s” (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, treat per Adult Pain Management Policy, ATG 2
▪ 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
▪ Routine administration of oxygen is not indicated if saturation is >93%

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
▪ Adult Pain Management ATG 2
ST ELEVATION MYOCARDIAL INFARCTION (STEMI)

ALWAYS USE STANDARD 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
- Routine administration of oxygen is not indicated if saturation is >93%
- Determine if patient is stable or unstable, and transport to appropriate facility
- Provide Early STEMI Notification and identifying patient information
  - If elevation in leads II, III, and AVF, suspect RVI and perform right-sided ECG.
- Transmit all STEMI ECGs to SRC if possible
  - To determine if patient is stable or unstable:

<table>
<thead>
<tr>
<th>Stable</th>
<th>Unstable</th>
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<tbody>
<tr>
<td>Stable VS and no indication of shock</td>
<td>SBP&lt; 90 (prior to NTG and opioid 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>
<td></td>
<td>Patient’s condition, based on paramedic judgment, requires immediate hospital intervention</td>
</tr>
</tbody>
</table>

- Stable patient:
  - May go to preferred SRC if the estimated transport time is not more than 15 minutes longer than the nearest SRC
  - Preferred SRC defined:
    - Patient preference
    - SRC used by treating cardiologist.
- Unstable patient:
  - Transport to the closest SRC

SPECIAL CONSIDERATION
- Early notification report to include: age, gender, patient identifying information, symptoms (including presence or absence of chest pain), and 12-lead findings

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 STANDARD PRECAUTIONS

INDICATION
- The presence of a palpable pulse and/or blood pressure for at least 30 seconds after cardiac arrest

 PHYSICIAN CONSULT
- If SBP < 80, obtain physician consult for Push-dose Epinephrine

TREATMENT
- ALS RMC
  - Maintain oxygen saturation 94%-99%
  - ETCO₂ if available
  - Avoid excessive ventilation. Start at 10-12 breaths/min and titrate to target ETCO₂ 35-40 mm Hg
- 12-lead ECG / Early Notification if STEMI
- Elevate head 30° if patient is conscious
- Transport to nearest available STEMI Receiving Center
- For BP < 80 mm Hg:
  - NS 1-2 liter bolus; if no improvement, PHYSICIAN CONSULT for Push-dose Epinephrine:
  - Mix 1mL Epinephrine 0.1mg/mL with 9mL Normal Saline in a 10mL syringe
  - Administer Push-dose Epinephrine 1mL IV/IO every 3-5 minutes
  - Titrate to maintain a SBP >80mmHg
  - Monitor blood pressure every five minutes

SPECIAL CONSIDERATION
- Consider and treat possible contributing factors:
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DOCUMENTATION- ESSENTIAL ELEMENTS
- Cardiac rhythm documentation
- 12-lead findings

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- 12-lead Electrocardiogram ALS PR 12
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