BLS

- Compression rate 100-120/min
- Ventilation rate (compression-to-ventilation ratio)
  - Neonate: 20-30/min (3:1)
  - Pediatric: 10-12/min (15:2)*
- Use metronome or other real-time audiovisual feedback device
- Rotate compressor at least every 2 min
- Use mechanical compression device, if size-appropriate available
- O2 and/or ventilate with BVM
- Monitor O2 saturation
- Apply AED during CPR and analyze as soon as ready

VAD
- Perform CPR
- Contact BH for additional instructions

TAH
- Contact BH for instructions

ALS

- Apply defibrillator pads during CPR. Defibrillate immediately for VF/pulseless VT.
- IV/IO Ⓐ
- Capnography with waveform and value
- NG/OG tube PRN

Team leader priorities
- Monitor CPR quality, rate, depth, full chest recoil, and capnography value and waveform
- Minimize interruption of compressions (<5 sec) during ECG rhythm checks
- Charge monitor prior to rhythm checks. Do not interrupt CPR while charging.

VAD/TAH
- See Adjunct Cardiac Devices section

Capnography
- If $EtCO_2$ rises rapidly during CPR, pause CPR and check for pulse

Specific protocols (see below)
- Arrhythmias
  - Unstable bradycardia
  - Supraventricular tachycardia
  - Ventricular tachycardia
  - Ventricular fibrillation / pulseless VT
  - Pulseless electrical activity / asystole
- Return of Spontaneous Circulation
- Adjunct Cardiac Devices

*Continuous compressions are an acceptable alternative for pediatric CPR

UNSTABLE‡ BRADYCARDIA

- Obtain 12-lead ECG, when able

Infant/child (<9 years) with HR <60 BPM
OR
Child (9-14 years) with HR <40 BPM

- Ventilate with BVM

If no increase in HR after 30 sec of BVM ventilations

- If unconscious, begin CPR
- Epinephrine 1:10,000 per drug chart IV/IO, MR x2 q3-5 minutes. MR q3-5 minutes BHO
- After 3 doses of epinephrine
  - Atropine per drug chart IV/IO, MR x1 in 5 min
- Consider midazolam per drug chart IV/IO PRN pre-pacing BHO
- Consider cardiac pacing BHO

‡Exhibiting any of the following signs/symptoms of inadequate perfusion, e.g.,

- Altered mental status (decreased LOC, confusion, agitation)
- Pallor, mottling, or cyanosis
- Diaphoresis
- Difference in peripheral vs. central pulses
- Delayed capillary refill
- Hypotension by age
  - <1 month: SBP <60 mmHg
  - 1 month – 1 year: SBP <70 mmHg
  - 1 year – 10 years: SBP <70 mmHg + (2x age in years)
  - ≥10 years: SBP <90 mmHg

SUPRAVENTRICULAR TACHYCARDIA

- Obtain 12-lead ECG

Infant/child (<4 years) with HR ≥220 BPM
OR
Child (≥4 years) with HR ≥180 BPM

Stable (symptomatic)
- Consider VSM
- Fluid bolus per drug chart IV/IO Ⓐ
- Adenosine per drug chart rapid IV/IO, followed with 20 mL NS rapid IV/IO, MR x2

Unstable‡
- Consider midazolam per drug chart IV/IO pre-cardioversion
- Synchronized cardioversion per drug chart, MR BHPO

‡Exhibiting any of the following signs/symptoms of inadequate perfusion, e.g.,
- Altered mental status (decreased LOC, confusion, agitation)
- Pallor, mottling, or cyanosis
- Diaphoresis
- Difference in peripheral vs. central pulses
- Delayed capillary refill
- Hypotension by age
  - <1 month: SBP <60 mmHg
  - 1 month – 1 year: SBP <70 mmHg
  - 1 year – 10 years: SBP <70 mmHg + (2x age in years)
  - ≥10 years: SBP <90 mmHg

VENTRICULAR TACHYCARDIA

- Obtain 12-lead ECG

Stable

- Fluid boluses per drug chart IV/IO to maintain SBP appropriate for age Ⓐ
- Amiodarone per drug chart BHPO
  OR
- Lidocaine per drug chart BHPO

Unstable‡

- Consider midazolam per drug chart IV/IO pre-cardioversion
- Synchronized cardioversion per drug chart, MR BHPO
- After successful cardioversion
  - Check BP. If hypotensive for age§ and rales not present, fluid bolus per drug chart IV/IO, MR
  - Obtain 12-lead ECG

‡Exhibiting any of the following signs/symptoms of inadequate perfusion, e.g.,

- Altered mental status (decreased LOC, confusion, agitation)
- Pallor, mottling, or cyanosis
- Diaphoresis
- Difference in peripheral vs. central pulses
- Delayed capillary refill
- §Hypotension by age
  - <1 month: SBP <60 mmHg
  - 1 month – 1 year: SBP <70 mmHg
  - 1 year – 10 years: SBP <70 mmHg + (2x age in years)
  - ≥10 years: SBP <90 mmHg

VENTRICULAR FIBRILLATION / PULSELESS VT

- CPR
- Defibrillate per drug chart as soon as monitor available/charged
- Defibrillate per drug chart q2 min while VF/VT persists
- Epinephrine 1:10,000 per drug chart IV/IO q3-5 min, begin after second defibrillation

Persistent VF/VT after 3 defibrillation attempts

- Amiodarone per drug chart IV/IO, MR per drug chart x2
  OR
- Lidocaine per drug chart IV/IO, MR per drug chart x1 q5 min

PULSELESS ELECTRICAL ACTIVITY / ASYSTOLE

- CPR
- Epinephrine 1:10,000 per drug chart IV/IO q3-5 min

Suspected hyperkalemia

- $CaCl_2$ per drug chart IV/IO, MR x1 in 5 min for continued ECG findings consistent with hyperkalemia
- $NaHCO_3$ per drug chart IV/IO
- Continuous albuterol/levalbuterol per drug chart via nebulizer Ⓐ

Suspected hypovolemia

- Fluid bolus per drug chart IV/IO, MR x2 Ⓐ

Suspected poisoning / OD

- For suspected tricyclic antidepressant, beta blocker, or calcium channel blocker overdoses, consider treatment per Poisoning / Overdose Protocol (S-165)[1]

Prolonged asystole / PEA

- After ≥20 min, contact BH physician for direction

[1] Naloxone is not authorized in cardiac arrest.

RETURN OF SPONTANEOUS CIRCULATION

- Ventilate PRN (goal of $EtCO_2$ = 40 mmHg)
- Obtain BP
  - If hypotensive[§] and rales not present, fluid bolus per drug chart IV/IO, MR Ⓐ
    - If unresponsive to fluid boluses, push-dose epinephrine 1:100,000 (0.01 mg/mL) per drug chart IV/IO, MR q3 min, titrate to adequate perfusion
- Obtain 12-lead ECG
- Provide cardiac monitor data to agency QA/QI department
- Monitor blood glucose PRN

Push-dose epinephrine mixing instructions

1. Remove 1 mL normal saline (NS) from the 10 mL NS syringe
2. Add 1 mL of epinephrine 1:10,000 (0.1 mg/mL) to 9 mL NS syringe

The mixture now has 10 mL of epinephrine at 0.01 mg/mL (10 mcg/mL) concentration.

[§]Hypotension by age

- <1 month: SBP <60 mmHg
- 1 month – 1 year: SBP <70 mmHg
- 1 year – 10 years: SBP <70 mmHg + (2x age in years)
- ≥10 years: SBP <90 mmHg

ADJUNCT CARDIAC DEVICES

Transport equipment and any knowledgeable family/support persons to ED with patient

VAD
- Contact BH and VAD coordinator
- Follow protocols for CPR and treatment of arrhythmias, including use of cardioversion, pacing, and defibrillation PRN

TAH
- Contact TAH coordinator
- Consult BH Physician for orders for TAH recommended treatments

Wearable defibrillators (vest)
- If vest device is broadcasting specific verbal directions, follow device's prompts
- If device not broadcasting directions and patient requires CPR or cardiac treatment, remove vest and treat

Malfunctioning pacemakers
- Treat per applicable arrythmia protocol
- Treat pain per Pain Management Protocol (S-173) PRN

Reported/witnessed AICD firing ≥2
- Amiodarone per drug chart, MR BHPO
  OR
- Lidocaine per drug chart, MR BHPO