



# **IU HEALTH PALS STUDY GUIDE**

## ***Preparing for your upcoming PALS course***

UPDATED November 2016

Course Curriculum: 2015 American Heart Association (AHA) Guidelines for Pediatric Advanced Life Support (PALS)

### **AHA recommends the following to successfully complete the course:**

1. Identification and treatment of problems that place the child at risk for cardiac arrest
2. Application of a systematic approach to pediatric assessment
3. Use of the “evaluate-identify-intervene” sequence
4. Use of PALS algorithms and flowcharts
5. Demonstration of effective resuscitation team dynamics
6. Ability to perform high-quality CPR and use an AED

### **Recommended Resources for Course Preparation:**

\*Pediatric Advanced Life Support Provider Manual (2015 Guidelines)

### **Optional Resources for Course Preparation:**

\*AHA PALS Pocket card

\*AHA 2015 Handbook of Emergency Cardiovascular Care for Healthcare Providers

\*PALS Student Website supplementary resources

**\*\* The Precourse Self-Assessment is mandatory. Link can be found on page ii (www.heart.org/eccstudent)of the PALS Provider Manual with the password code: pals15. Please bring a printed copy or electronic picture of your completed assessment with you to class. A score of 70% or higher is required. \*\***

To successfully pass the PALS course, AHA requires you to pass a written exam with a score of  $\geq 84\%$  and to successfully manage two core case scenarios as the team leader using the pediatric assessment model. The first core case will either be a respiratory or shock case. The second core case will be to correctly identify and treat a cardiac case.



In managing the cardiac case, you will be required to:

- recognize and correctly identify the cardiac rhythms or arrhythmias
- assess the patient's general condition using the Pediatric Assessment Model
- effectively treat the patient according to PALS algorithms
- utilize the recommended drugs and dosages
- safely administer any recommended electrical or shock treatment using a manual defibrillator

Each core case scenario can be found in the Appendix section of the PALS Provider Manual.

Course preparation is highly recommended to make your experience valuable, as well as to ensure your successful completion. You are encouraged to purchase or borrow a PALS Provider Manual to assist you in preparation for your course and the written exam. Any of the other AHA optional resources listed above may also be helpful. You will be allowed to use any of your resources for the core cases, but not the written test.

**This study guide is not to be considered a replacement for the *PALS Provider Manual*, the online pre-course assessment, and other resources offered by the AHA.**

### **BLS CPR**

BLS CPR changed in 2015. The new sequence for CPR is “CAB”: Compressions – Airway – Breathing. Here are the basic steps in the **BLS survey**:

1. Scene Safety
2. Check for responsiveness
3. Call for help and an AED (in hospital, call Code Blue)
4. Check for pulse and simultaneously scan the chest for breathing for 5-10 seconds
5. If no pulse, begin compressions – give 30 compressions then give two breaths—continue 30:2 ratio for one rescuer, 15:2 for 2 or more rescuers
6. Apply the AED as soon as it arrives. The use of an AED is now approved for use with infants, as well as children and adults.



## **Pediatric Assessment Model**

- 1. Initial Impression – What is your first impression when you walk in the patient’s room? What do you see and hear? (Including Consciousness, Breathing, Color)**
- 2. Primary Assessment - (A B C D E)**
  - a. **Airway** – Is it patent?
  - b. **Breathing** – rate, oxygen saturation, work and effort of breathing, breath sounds
  - c. **Circulation** – blood pressure, capillary refill, peripheral perfusion, heart rate and rhythm
  - d. **Disability** - Is the patient acting age appropriate?
  - e. **Exposure** – temperature, rashes, signs of trauma/bleeding
- 3. Secondary Assessment – (SAMPLE history and physical examination)**
  - a. **Signs & Symptoms**
  - b. **Allergies** – environmental and medications
  - c. **Medications**
  - d. **Past Medical History**
  - e. **Last Meal** – last item ingested
  - f. **Events** leading up to present illness or injury
  - g. **THE PHYSICAL EXAM** follows completion of the SAMPLE history
- 4. Tertiary or Diagnostic Assessment - include labs, x-rays, etc.**

For PALS purposes, get in the habit of assessing patients using the above guidelines.



## **Categorizing Illnesses/Injuries**

### **RESPIRATORY**

1. Respiratory distress – typically increased rate and effort
2. Respiratory failure – typically decreased rate and effort
3. Four Respiratory Categories
  - a. Upper airway obstruction – examples: croup, swelling, foreign body
  - b. Lower airway obstruction – examples: asthma, bronchiolitis
  - c. Lung tissue disease – example: pneumonia
  - d. Disordered control of breathing – examples: overdose, brain trauma or tumor

### **CIRCULATORY**

1. For signs of shock, assess:
  - a. blood pressure
  - b. capillary refill
  - c. peripheral perfusion
2. Baseline systolic blood pressure  $\geq 70 + (2 \times \text{age})$ 
  - a. Compensated shock – systolic is  $\geq$  blood pressure formula
  - b. Hypotensive shock – systolic is  $<$  blood pressure formula
3. Four Shock Categories
  - a. Hypovolemic shock- examples: hemorrhage, dehydration
  - b. Distributive shock – examples: sepsis, neurogenic
  - c. Cardiogenic shock – examples: cardiomyopathy, cardiac anomalies
  - d. Obstructive shock – examples: tension pneumothorax, cardiac tamponade



#### 4. Cardiac Core Cases

**Supraventricular Tachycardia (SVT)** - SUSTAINED - Rapid, narrow QRS, regular rhythm tachycardia with a rate > 180 in children and > 220 in infants



Use the Pediatric Assessment Model to determine if your patient is stable or unstable, and to identify and treat underlying causes.

**STABLE - adequate perfusion**

- Obtain a 12-lead ECG
- Attempt vagal maneuvers: ice to the face, blow through a straw, bear down, hard cough, etc.
- If vagal maneuvers aren't successful: administer **Adenosine** 0.1 mg/Kg
- May repeat with **Adenosine** 0.2 mg/Kg
- If both doses of **Adenosine** are unsuccessful: seek expert consultation

**UNSTABLE** – showing signs of poor perfusion

- Provide Synchronized Cardioversion  
0.50 – 1 Joule/Kg
- Seek expert consultation

**Sinus Bradycardia** - sinus rhythm with a rate less than 60 and very symptomatic

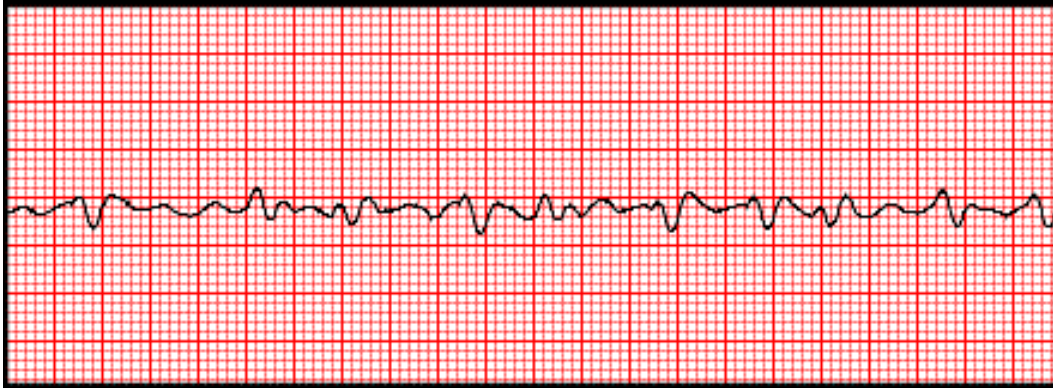


- Is your patient breathing less than 12 times per minute?
  - Initiate Code Blue
  - Provide rescue breathing at a rate of 1 breath every 3 to 5 seconds
- If rescue breathing does not cause the heart rate to increase, and/or there is poor perfusion:
  - Begin chest compressions
  - Administer **Epinephrine** 0.01 mg/Kg
  - Work in 2 minute CPR cycles
  - **Epinephrine** 0.01 mg/Kg given every other cycle or every 3-5 minutes

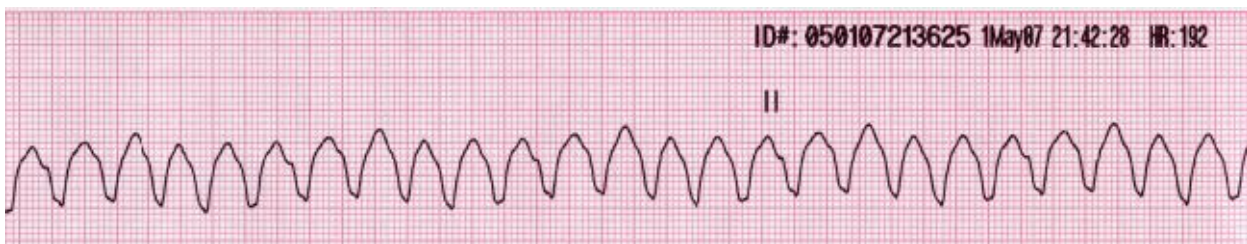


- If CPR, Epinephrine, and treating reversible causes, are ineffective, be prepared for transcutaneous pacing

## **Ventricular Fibrillation (V-Fib/VF)**



## **Pulseless Ventricular Tachycardia (VT/V-Tach)**



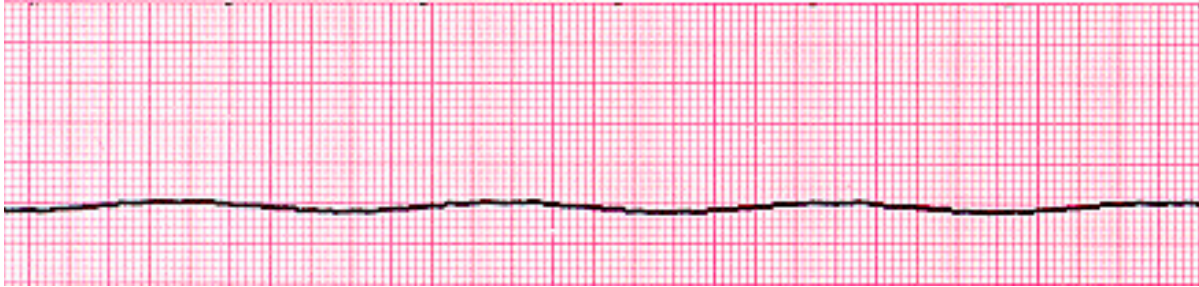
Both V-Fib and Pulseless V-Tach require immediate defibrillation. Once you determine your patient has one of these arrhythmias (completed your BLS survey and identified the rhythm), proceed as follows:

- Initiate Code Blue and begin chest compressions
- Defibrillate ASAP at 2-4 Joules/Kg
- Immediately resume CPR for 2 minutes
- During this 2 minute cycle:
  - Obtain IV or IO access
  - Prepare your first drug: **Epinephrine 0.01 mg/Kg**
  - Begin discussing reversible causes
- Rhythm check – if unchanged:
  - Defibrillate ASAP at 4 Joules/Kg
  - Resume CPR
  - Administer **Epinephrine 0.01 mg/Kg**
  - Prepare second drug: **Amiodarone 5 mg/Kg or Lidocaine 1 mg/kg**
- Continue to work in 2 minute cycles. After each subsequent defibrillation:
  - If appropriate, administer the drug you have prepared

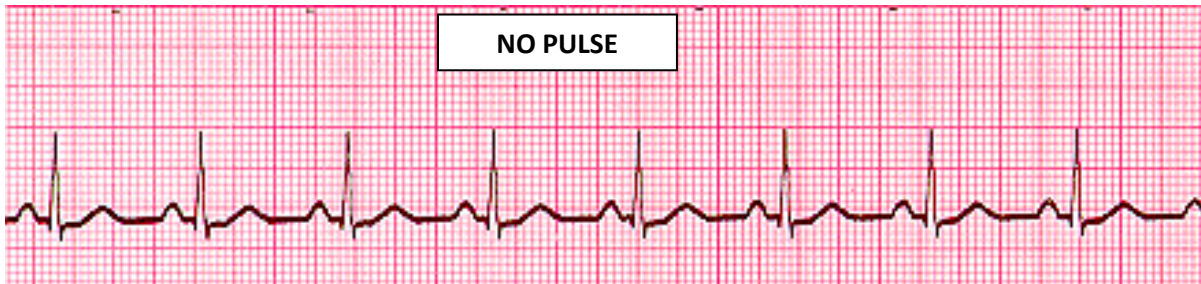


- Prepare your next drug
- Continue to talk about reversible causes (Hs and Ts)

**Asystole** – There is no electrical or mechanical activity. Asystole is a pulseless, **non-shockable** rhythm that requires immediate intervention.



**Pulseless Electrical Activity (PEA)** – Electrical activity without mechanical contractility. There is an organized rhythm, but the heart is not pumping. PEA is a pulseless, **non-shockable** rhythm that requires immediate intervention.



Once you determine your patient has one of the above rhythms (completed your BLS survey and identified the rhythm), proceed as follows:

- Initiate Code Blue and begin chest compressions
- Administer **Epinephrine 0.01 mg/Kg**
- Work in 2 minute CPR cycles
- **Epinephrine 0.01 mg/Kg** given every other cycle or every 3-5 minutes



## **Reversible Causes / Hs and Ts**

A critical step to restoring a perfusing rhythm is to quickly identify the underlying, reversible causes. The most common are known as the Hs & Ts.

### Hs

- Hypovolemia
- Hypoxia
- Hydrogen Ion (Acidosis)
- Hypo-/Hyperkalemia
- Hypothermia
- Hypoglycemia

### Ts

- Tension Pneumothorax
- Tamponade, cardiac
- Thrombosis, pulmonary (PE)
- Thrombosis, cardiac
- Toxins (Drugs/Environmental)





## PALS Pharmacology

**Fluid boluses** - PALS recommends the use of isotonic crystalloids at the following rates:

- Normal cardiac function – 10-20 mL/Kg over 5-10 minutes
- Myocardial dysfunction - 5-10 mL/Kg over 10-20 minutes

**Note:** Pediatric drug doses may not exceed the recommended adult dose.

### **Drugs for Bradycardia**

**Epinephrine** (1:10,000 concentration): 0.01 mg/Kg IV/IO Push (maximum 1 mg) followed by a flush; repeat throughout code every 3-5 minutes. There is no maximum total dose.

**Atropine:** 0.02mg/Kg IV/IO IV Push followed by a flush; for the treatment of bradycardia caused by increased vagal tone

### **Drugs for SVT**

**Adenosine:** 0.1 mg/Kg (maximum 6mg) rapid IV Push followed by an immediate flush; may repeat with a 0.2 mg/Kg dose (maximum 12 mg) if needed.

*-Fast push and fast acting drug that results in a short period of asystole*

### **Drugs for Pulseless Arrest - VF/VT**

**Epinephrine** (1:10,000 concentration): 0.01 mg/Kg IV/IO Push (maximum 1 mg) followed by a flush; repeat throughout code every 3-5 minutes. There is no maximum total dose.

**Amiodarone:** 5 mg/Kg IV/IO Push (maximum first dose 300 mg) followed by a flush.

Maximum total dose: 15 mg/Kg/day

**Lidocaine:**

### **Drugs for Pulseless Arrest - Asystole/PEA**

**Epinephrine** (1:10,000 concentration): 0.01 mg/Kg IV/IO Push (maximum 1 mg) followed by a flush; repeat throughout code every 3-5 minutes. There is no maximum total dose.



## References

2010 Handbook of Emergency Cardiovascular Care for Healthcare Providers. (2010). American Heart Association.

Chameides, L., Samson, R., Schexnayder, S., Hazinski, M. & Ashcraft, J. (Eds.). (2011). *Pediatric advanced life support provider manual*. Dallas, Texas: American Heart Association.

PALS Pocket Card. (2011). American Heart Association.