Shaun Fix

Emergency Medical Consultants

The Premier Provider Of Quality Medical Training Programs

Nationally Accredited and OSHA Programs

Medical CE Provider

Since 1988

PEDIATRIC ADVANCED LIFE SUPPORT

Red Cross Participant Preparation Packet 2022

This information is derived from the 2020 ECC guidelines

This packet contains prep information for the PALS Course.
We strongly recommend completing these exams prior to the course.

-MANDATORY REQUIREMENTS-

#1 Participants are required to have and review the current textbook.

#2-Complete the Mandatory Pre-course Assessment exam. Min score 70%.

#3 Be familiar with all BLS skills for children and infants.

PARTICIPANTS MUST REVIEW THIS PACKET PRIOR TO THE COURSE

Specific items to review/ study - www.MedicalTraining.cc > Courses > American-Red-Cross-Courses

If you are attending the BLS section after PALS you will need to download the book, prep packet, & pretest.
(There is mandatory pretest if you are choosing to do BLS)

Course Date/Time: _____ Location: _____

Name: _____

(772) 878-3085 * Fax: (772) 878-7909 * Email: info@medicaltraining.cc
597 SE Port Saint Lucie Blvd * Port Saint Lucie, Florida 34984
Visit Our Website- MedicalTraining.cc

Emergency Medical Consultants

The Premier Provider Of Quality Medical Training Programs

Nationally Accredited and OSHA Programs
Medical CE Provider
Since 1988

This copyrighted prep packet is a supplement for those students taking PALS with EMC.

Welcome to the latest Pediatric Advanced Life Support course sponsored by Emergency Medical Consultants Inc. The Full training course is two days. The refresher course is one day only. NOT ALL 2 DAY COURSES HAVE A ONE DAY REFRESHER COMPONENT – PLEASE VERIFY WITH OUR OFFICE **IF** WE ARE OFFERING A ONE DAY COURSE AND **WHICH DAY** IT WILL BE.

The PALS course stresses early recognition and management of pre-terminal events rather than merely "running a pedi code". We use no stress, small group interactive skills and scenario stations to present the information in a fun, relaxed atmosphere. We are pleased you have chosen our program and are sure you will find the course informative and worthwhile.

In order to keep our programs "Stress Free" and assure all participants meet the requirements for proficiency, a certain amount of home study is required prior to the actual class. According to mandates, participants will have access to the latest textbook, review it, and suggest completing the pretest prior to entering the program**.**

The evaluation process consists of a written exam, on which participants are required to score at least 84% and three patient management scenarios requiring appropriate treatment. Again, these stations are designed to be user friendly and low stress.

We work very hard to keep our programs upbeat, relevant and at a level ALL participants who have prepared will pass with ease. Our faculty is always available to explain information or procedures, just ask.

All information is based on PALS standards at the time of printing and thought to be correct. Providers are encouraged to review the PALS textbook and their specific policies prior to implementing any procedures or administering any medication based on this study packet.

This packet contains prep information and a pretest.

For more EKG practice, log onto www.Skillstat.com

If you have any questions or comments feel free to call our office at 772-878-3085.

We look forward to seeing you in the PALS program.

Shaun Fix
President, Emergency Medical Consultants Inc.

Pediatric Advanced Life Support
Syllabus
Approx. 14 hours

Two Day Full Training Program

Day One

Program Introduction
Foundational Concepts
Systematic Pediatric Assessment
Recognition of Respiratory Failure & Shock
Break
Quality BLS Resuscitation
Case Review Respiratory
Case Review Circulatory
Lunch
Skills stations

1. Respiratory Emergencies, Airway management
2. Shock, Vascular Access IV & IO Skills, medication & delivery method review
3. High Performance Team- Child/Infant CPR & Defibrillation

Day Two

Review of Arrhythmias and Electrical Therapy
Group Review of Patient Cases
Break
Resuscitation Code Card/ Algorhythms
Patient Case management Scenarios / Simulations

1. Shock and Trauma – Includes Tachycardia
2. Respiratory Emergencies – Includes Bradycardia
3. Cardiac Cases – High Performance Team Megacode & Post Arrest Care

Lunch
Evaluations

1. Written Exam
2. Scenario Management Evaluation

Pediatric Advanced Life Support
Syllabus

One Day- Refresher Program
Approx. 7 hours

Program Introduction
Pediatric Assessment, Recognition of Respiratory Failure and Shock

Break
High Performance Resuscitation Team
Overview of Rhythms / Algorithms
Skills Review, Respiratory Management, Vascular Access, Review CPR Standards

Lunch
Group Review of Case Management
1. Cardiac Cases – High Performance Team Megacode & Post Arrest Care
2. Respiratory Cases – Includes Bradycardia
3. Shock Cases - Includes Tachycardias

BLS Child & Infant Skills Check-off

Evaluations
1. Written Exam
2. Scenario Management Evaluations

ASSESSING KIDS

Think like the Child

"A giant stranger is coming after me"
"Mom says don't talk to strangers"
"If I say I'm OK they'll leave"

Unique issues when dealing with children

They don't think we are heroes when we are there to treat them
Medically, they "hide" illness and injury by maintaining normal vital signs
Head injuries and liver bleeds are 2 culprits that can cause a slow deterioration

Tips for dealing with children

Understand MOST of us don't get to regularly evaluate signs and symptoms in kids
Remember they may present a little differently
Assess the conscious child from across the room initially
If appropriate, use the parents for psychological first aid
Talk to the child about himself and his toys to gain a rapport
Unlike adults, stable kids will generally stay that way if we support their ABC's

*Continually review the unique presentation of respiratory and circulatory compromise in children since it differs from the adult patients we are used to dealing with

Good resources for pediatric information

American Academy of Pediatrics 847-434-4000 www.aap.org
American College of Emergency Physicians 800-798-1822 www.ACEP.org
EMSC 202-844-4927 www.ems-c.org
National Safe Kids Campaign 202-662-0600 www.safekids.org
National Center for Injury Prevention and Control 770-488-1506 www.ohcinfo@cdc.gov

Heart Rate		**Resp Rate**		* **Lowest acceptable (systolic)BP**	
Infant (<1 yr)	100-180	Infant (<1 yr)	30-50	Infant (1mo-1yr)	70-100
Toddler (1-3 yrs)	90-140	Toddler (1-3 yrs)	24-40	Toddler (1-3 yrs)	85-105
Preschool (3-5 yrs)	80-130	Preschool (3-5 yrs)	20-30	Preschool (3-5 yrs)	89-115
School Ages (6-12 yrs)	70-120	School Ages (6-12 yrs)	16-26	School Age (5-12)	94-120
Adolescent (>12 yrs)	60-100	Adolescent (>12 yrs)	12-20	Adolescent (>12 yrs)	110-135

***In general, 70 + Age x 2 is the lowest acceptable systolic**

Heart rate and resp rate may be lower while asleep

TEAM CONCEPT

- Realize that resuscitation involves professionals of various levels throughout the code then following through to post resuscitation management.
- Team leader needs to clearly define each person's role. If you are assigned a role that you are not skilled to do immediately notify the team leader and offer to function in another capacity.
- Each team member performs a specific task: ventilations, compressions, medications, vascular access, defibrillation, and documentation / timing. The team must work together under the guidance of a Team Leader to coordinate the combined resuscitation attempt.
- The team must work together and understand what "the next step" is going to be in order to be prepared to carry out skills quickly and efficiently during "pause for evaluation" phase every 2 minutes.
- There should be a closed-loop communication from the team leader to the team and back.
  Example: as the team leader requests the next procedure the team member should repeat back what they understood the direction to be. This makes for a clearer understanding and reduces mistakes

- Keep in mind the team leader could make a mistake in an order and constructive intervention from other team members may be appropriate to maintain consistency within the ACLS Guidelines.
- Chest compressions can be evaluated by the presence of a palpable pulse with compressions, indwelling arterial catheters readings and end tidal CO_2 level.

Debriefing is an effective tool to review the decision-making process that was utilized during the resuscitation event. The team leader directs the team to evaluate the objective data gathered during the event, then discusses the pros and cons of the interventions. Finally, the actions taken during the event are summarized, and this information is then used to identify ways to improve future outcomes.

PEDIATRIC ASSESSMENT SEQUENCE

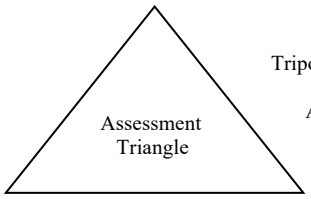
*INITIAL IMPRESSION

"Sick or not sick"

RAPID ASSESSMENT
General Appearance Most Crucial

Appearance

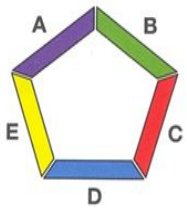
TICLS:
Tone
Interactivity
Consolability
Look/gaze
Speech/cry



Work of Breathing
Tripod or sniffing position
Retractions
Audible breath sounds

Circulation to Skin
Pallor or grey
Mottled/flushing
Cynotic/dusky
Obvious bleeding/ Petechia purpura

*ASSESS



Primary Assessment

Airway	**B**reathing	**C**irculation	**D**isability	**E**xposure
Patent?	Present?	Present?	Level of	expose body
Noiseless?	Rate	extremities	consciousness	and
	Effort	cap refill		exposure control
	Sounds			

Secondary Assessment

Physical Exam	SAMPLE History	Bedside Tests
Head	*Symptoms *Past history	*Vital signs
to toe	*Allergies *Last intake	*Glucose
as needed	*Meds *Events causing incident	*Monitors (O_2,EKG)

*Recognize

Respiratory Problem	Circulatory Problem (Shock)	Cardiac Problem (Tachy, Brady or CP Failure)

*Care

Manage

A – position Airway if needed
B – manage Breathing = blow by O_2 to BVM, intubation or meds as needed
C – support Circulation = from EKG to vascular access, fluids or meds as needed

RESPIRATORY DISTRESS / RESPIRATORY FAILURE

The key to pediatric resuscitation is to recognize early and treat aggressively before the child decompensates.

Respiratory distress

Potential respiratory failure: Increased work of breathing

- Tachypnea/Tachycardia
- Pallor
- Anxiety /Agitation / Irritability
- Retractions/Accessory muscle use
- Nasal flaring

Probable respiratory failure:

- Lethargy
- Head bobbing
- Grunting
- Cyanosis / Pallor

Respiratory failure: Inadequate ventilation or oxygenation

- Slow respirations/diminished breath sounds
- ↓ SaO_2/bradycardia

Cardiopulmonary failure:

- Agonal breathing- inadequate respiratory effort
- Bradycardia-hypotension & diminished central pulses

Four types of Respiratory Problems

Upper airway obstruction (Croup)
Stridor/barking cough
Voice change/drooling
↑ inspiratory effort with retractions

Lower airway obstruction
Asthma, Bronchiolitis
↑ expiratory effort
Prolonged expiratory phase
Wet 'junky'cough
Wheezing
Possible ↓ air movement

Lung tissue disease
Pneumonia
Pulmonary edema
Grunting
Crackles (rales)
Decreased air movement
Hypoxia

Disordered control of breathing
Irregular rate & pattern
Variable effort/ Inadequate effort
Central apnea
May occur post seizure

Respiratory Management

Maintain airway

- Usually done by patient if awake
- For decreased level of consciousness place in "sniffing position" (supine with neck and head slightly elevated)

Assist with oxygen – only enough to maintain saturation between 94-99%

- Blow-by, if alert and apprehensive
- Direct mask if the child will accept and needs it
- Bag valve mask for low rate or tidal volume-*over 1 sec, for partial chest rise-every 2-3 seconds*
- Intubation - see indications below
- Suction as indicated

Consider intubation by a skilled professional for the following:

- Unconscious in profound shock
- Any patient requiring bag valve mask ventilations for more than one minute
  - respiratory arrest
  - respiratory depression not responding to bag-valve-mask ventilations
  - bradycardia not responding to bag valve mask ventilations
  - tachypnea with poor tidal volume not responding to bag-valve-mask

Endotracheal Tube (ETT) 2020
Cuffed is preferred, as it can improve capnography and ventilation by decreasing the need for reintubation and potential aspiration.
Choose cuff size and monitor cuff pressure carefully.
-Observe BL chest rise
- Auscultate lungs/epigastrium
- Evaluate capnography

If an intubated patient suddenly deteriorates think **"DOPE"**

- **D**isplaced tube
- **O**bstructed tube. (*not necessarily in this order*)
- **P**neumothorax
- **E**quipment failure (i.e. ventilator failure, BVM failure, O_2 empty, etc.)

SHOCK

Shock: inadequate perfusion to meet the metabolic demands of the tissues. Serum Lactate blood test can help identify lock poor oxygenation of organs/ cells.

Anaphylactic Shock:
Severe allergic reaction-
Hives/wheezing
Angioedema
Tachycardia/dyspnea

TX:
Epinephrine
Antihistamines
Steroids

Early signs of inadequate perfusion

- Tachycardia
- Decreased perfusion of skin – cool, pale or mottled, delayed capillary refill
- Altered mentation
- Diminished peripheral pulses
- Hypotension is a late sign of shock & is not a *consistent feature* of shock

Septic Shock- Systemic, life-threatening infection. May have petechiae, fever & dyspnea. Get blood cultures Early broad spectrum antibiotics are recommended.

Compensated shock – patient showing signs of shock with a normal B/P

Hypotensive shock – shock with hypotension (generally not seen until 30% fluid loss)

General Treatment Guidelines: Goal- restore a favorable balance between tissue perfusion and metabolic demand with a focus on oxygen delivery and oxygen demand.

- Assess responsiveness frequently
- Maintain Airway
- Improve O_2 delivery
- Maintain Body Temperature
- Monitor EKG and Pulse oximetry
- Obtain vascular access (IV or IO)
- Support organ function/lactate level/CBC/blood cultures
- Administer Fluid Bolus's per shock etiology
- Administer blood products, if indicated
- Consider vasopressors for refractory, cardiac, or septic shock
- Reduce oxygen demand
    - support breathing
    - control pain and anxiety
    - manage fever
- Prevent progression to cardiac arrest (bradycardia-hypotension & diminished central pulses)

Hypovolemic Shock:
The most common type of shock in children secondary to reduced intravascular volume.
Causes:
Diarrhea
Vomiting
Hemorrhage
Burns
Dehydration

<u>If IV access is not readily accessible</u> in a patient in arrest, near arrest or profound shock, proceed with intraosseous infusion. Simple and effective route to establish vascular access.

Contraindications for IO access:
--Fractures or crush injuries near the access site
--Fragile bone conditions (eg, osteogenesis imperfecta)
--Previous IO attempts in the same bone
--Avoid if infection present in the tissue overlying bone

***Any meds given by IV can be given IO

IV tips:

- Don't tie the tourniquet too tight
- Use transilluminator if available
- Immobilize the child if necessary flush the angiocath with heparin flush solution or saline
- Leave the plug off the end of the angiocath
- Bevel down for small or superficial veins
- Use skin prep (i.e. benzoin) and lots of tape
- Secure to IV board if necessary

In the trauma patient with shock give two fluid boluses; if symptoms are still present consider PRBC or blood.

The Standard for Ventilation Assessment- CO_2 Waveform Capnography

- CO2 waveforms provide a more sensitive and rapid evaluation of respiratory function than pulse oximetry
- Specifically evaluating VENTILATION/ PERFUSION
- Normal CO_2 is 35-45mmHg
- CO_2 is acid
- High CO_2 - denotes respiratory acidosis-
    - Low CO_2 - during cardiac arrest indicates low perfusion
- May be common during arrest due to CPR being the only perfusion
    - (compressions are only about 20% as effective as normal blood flow)
- Goal is to maintain CO_2 above 10 mmHg in Cardiac Arrest states
    - If CO_2 remains below 10mmhg throughout code, survival is virtually "0"
- Use End tidal CO2 (after intubation) to evaluate:
    - ET tube placement (Is there any CO2?)
    - Effectiveness of Compressions, is the CO2 level above 10mmhg? If not, evaluate compressions.

CARDIOPULMONARY FAILURE

Bradycardia (below 60/min) with Agonal Breathing

Assess ABC's
Ventilate
Administer 100% Oxygen
Intubate when appropriate
Assess Vital Signs
Obtain vascular access

↓

Cardiorespiratory Compromise?
Poor perfusion
Hypotension
Respiratory distress

↓

No
Observe
Support CAB's
Transport → peds facility

Yes
Perform chest compressions if despite oxygenation & ventilation:
Heart rate <60/min

Continue CPR until rate sustains at greater than 60 min, ideally over 80 -100

↓

Epinephrine
IV/IO: 0.01 mg/kg 1:10,000
Administer within 5 min of start of compressions

↓

Repeat Epinephrine every 3 -5 minutes at same dose

↓

Atropine
0.02 mg/kg (usually not used in children < 1 year)
Min. dose: 0.1 mg
Max single dose: 0.5 mg for child
1.0 mg for adolescent
May be repeated once

↓

Consider transthoracic/transvenous pacing

↓

Consider treatable causes
Hypoxia } the 2 most reversible causes
Increased vagal tone
Hypoglycemia
Hypothermia
Herniation of brain stem

In general, children require defibrillation much less frequently than adults, however more recent studies confirm ventricular fibrillation is more prevalent than previously thought and may be missed due to the fact that EKG's may not be initiated as rapidly as in adults.

DEFIBRILLATOR – REQUIRED KNOWLEDGE
JOULE (WATT SECONDS) SETTINGS:

DEFIBRILLATION: 2 J/kg First attempt, 4 J/kg later attempts
(higher doses may be considered up to 10 J/kg)
CARDIOVERSION: 0.5-1.0 J/kg. May increase to 2 J/kg

1. Knows how to turn monitor AND defibrillator on
2. Knows how to set current (joules)
3. Knows how to set sync button for perfusing rhythms
4. Knows how to discharge paddles to patient
5. Knows how to QUICK LOOK / Paddle function vs. lead select
6. Knows where to position paddles/ pads
7. Knows how to change to pediatric paddle size
8. Knows indications for use:
   Ventricular fibrillation
   Ventricular Tachycardia
   Supraventricular tachycardia
9. Knows to clear the patient area
10. Knows what interface media to use – gel or pads
11. Knows current to use in children and infants

Automated External Defibrillator
Shocks at preset energy levels

Physio Control Lifepak Model: Manual Defibrillator
Operator chooses energy level

AED – (Automatic defibrillator) can be used on all children and infants. Ideally, use pediatric pads because they reduce the energy as it comes from the defibrillator. If pediatric pads are not available, adult pads may be used, as the risk of allowing ventricular fibrillation to deteriorate into asystole is greater than the risk posed by the higher energy of the AED using adult defibrillation doses.

Skills Review for Healthcare Providers
The ABC's of CPR

Simultaneously Determine unresponsiveness and check for <u>effective</u> breathing

If unresponsive: call a "code" or 911

A = Airway- Open airway (head tilt/chin lift)
B = Breaths- Give 2 breaths then back to compressions
C = Circulation- Check for a pulse Max - 10 seconds. If pulse is not <u>definite</u>, begin compressions
D = Defibrillator- Attach a manual defibrillator or AED

CPR Reference

	Adults (> puberty)	Children (1 - puberty)	Infants (< 1yr)
Rescue breathing, Victim definitely has a pulse	10 breaths/min recheck pulse every 2 minutes	20-30 breaths/min recheck pulse every 2 minutes	20-30 breaths/min recheck pulse every 2 minutes
Compression landmark **No pulse** (or pulse <60 in infant or child with poor perfusion)	Middle of the chest, between the nipples	Middle of the chest, between the nipples	1 finger below nipple line
Compressions are performed with	Heel of 2 hands	Heel of 1 or 2 hands	2 fingers OR 2 thumbs when using encircling hands technique
Rate of compressions per minute	100-120/min	100-120/min	100-120/min
Compression depth (Allow full recoil)	At least 2 inches ↑ 2 inches	At least 1/3 depth of chest 2 inches	At least 1/3 depth of chest 1 ½ inches
Ratio of compressions to breaths **Once an advanced airway is placed ventilations will be 1 every 6 sec. with continual compressions.*	30:2 Change compressors and reevaluate every 2 min	30:2 15:2 if 2 rescuer Change compressors and reevaluate every 2 min	30:2 15:2 if 2 rescuer Change compressors and reevaluate every 2 min

Foreign Body Airway Obstruction

** If not rapidly removed call Emergency Medical Service **

Conscious choking

Adult	Child	Infant
5 Back Blows/ 5 Abdominal Thrusts	5 Back Blows/ 5 Abdominal Thrusts	5 Back Blows/ 5 Chest Thrusts

Unconscious choking

Adult	Child	Infant
Call a "code" or call 911 Begin ABC's of CPR Before giving breaths: look in mouth for foreign body, remove object if it is seen. Repeat cycles of CPR if needed	Begin CPR If second rescuer is present, send them to call a "code" or 911, otherwise, call after 2 min of CPR Before giving breaths: look in mouth for foreign body, remove object if it is seen. Repeat cycles of CPR if needed	Begin CPR If second rescuer is present, send them to call a "code" or 911, otherwise, call after 2 min of CPR Before giving breaths: look in mouth for foreign body, remove object if it is seen. Repeat cycles of CPR if needed

Cardiac Rhythm Disturbances

Most children do not have significant cardiac dysrhythmias causing instability (do not take this to mean that children never have cardiac dysrhythmias). In general rhythm disturbances in children are treated emergently when the patient is symptomatic or if the rhythm is likely to deteriorate.

In children, rhythms are classified as:

Tachy (Fast):

First sign of stress
Look for causes other than cardiac (i.e. fever, pain, hypovolemia)
Not considered SVT unless 220 in infant, 180 in child.
Signs of SVT – no p wave, HR does not vary with activity, abrupt onset, narrow complex
Wide complex (>.09 sec or 2 boxes) may be v-tach

Brady (Slow) Causes:

Hypoxia
Hypothermia
Hypoglycemia

Collapse (Absent):

Frequently the end result of prolonged hypoxia and/or acidosis
May be Agonal/Asystole, pulseless electrical activity (PEA) or v-fib/pulseless v-tach

Newborn Resuscitation

Quick History: Multiple birth? Prematurity? Meconium? Narcotic Use?
Quick Assessment: Term of gestation? Amniotic fluid clear? Breathing or crying? Good muscle tone?

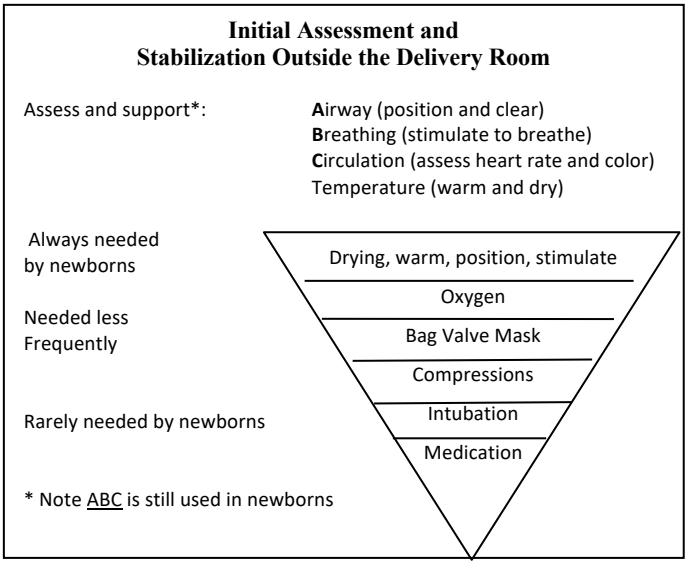
Term Newborn Vital Signs

Heart rate (awake): 100 to 180 bpm
Respiratory rate: 30 to 60 breaths/min
Systolic blood pressure: 55 to 90 mm Hg
Diastolic blood pressure: 25 to 55 mm Hg

APGAR SCORE

Sign	0	1	2
Heart rate (bpm)	Absent	Slow (<100 beats/min	≥100 beats/min
Respirations	Absent	Slow, irregular	Good, crying
Muscle tone	Limp	Some flexion	Active motion
Reflex irritability (to a catheter in the nares, tactile stimulation)	No response	Grimace	Cough, sneeze, cry
Color	Blue or pale	Pink body with Blue extremities	Completely pink

7 – 10 Normal
4 – 6 Moderately depressed requires O_2 and stimulation
0 – 3 Severely depressed requires resuscitation



Meconium

- Suction Mouth and nose, *only if obstructed*
- Intubate and suction using meconium aspirator, *only in depressed neonates with thick meconium present.*
- Repeat with new ETT until clear
- Then start pyramid

Initial Management of the Pediatric Arrest
"Emergent Team Actions"
Shaun Fix

I. Introduction

Perhaps the greatest stressor for the medical provider is dealing with and managing the uncommon cardiac arrest in the pediatric population. While adult "codes" are routine, "pedi codes" become hectic, frantic, ad chaotic- thus, the "load and go" response takes over. This session is designed to give participants a brief overview of the pediatric arrest pathophysiology, expected outcomes and a simple format to effectively apply BLS and ALS procedures in order to give your patient their best chance for survival.

II. Learning objectives

At the end of this program the participant will be able to:

1. Discuss the pathophysiology of the pediatric arrest in contrast to the adult.
2. Discuss expected outcomes for the pediatric patient who arrests
3. Explain the use of oxygen and bag valve mask in the pediatric patient
4. Describe intubation differences in the pediatric population
5. State which medications can be given via the endotracheal tube.
6. Discuss the importance of proper BLS procedures-CPR, immobilization, O2 and temperature regulation
7. State the indications and procedures for intraosseous access
8. Explain the concept of a precalculated pharmacology system

III. Discussion / Summary

The prognosis for the pediatric patient who suffers cardiac or respiratory arrest is poor; the only real way to reduce child deaths is to stress prevention. The most common causes are respiratory in nature, thus, in the nontraumatized patient it is imperative that providers manage the victim with excellent CPR, appropriate airway procedures and oxygenation, shock control, and initial medications where the patient lies to give the child the greatest chance of survival.

Things to keep in mind:

- Children may not be small adults- but the principles of care are unchanged. Circulation, Airway, and Breathing support can be accomplished rapidly and with little difficulty by the initial responding providers.

- Excellent ACLS with poor BLS is of no value. Immediate BLS management and CPR are of paramount importance.

- Medical codes should receive ALS treatment where the patient lies- Along with good CPR, oxygen, upgraded airway, intraosseous infusion, and initial pharmacology if possible within a reasonable time.

- Trauma is still treated in the operating room. Secure C-spine and airway "Load and Go" with secondary treatment, IV's and meds enroute.

- *Cool is the rule*! As our stress levels increase, our patient care levels decrease.

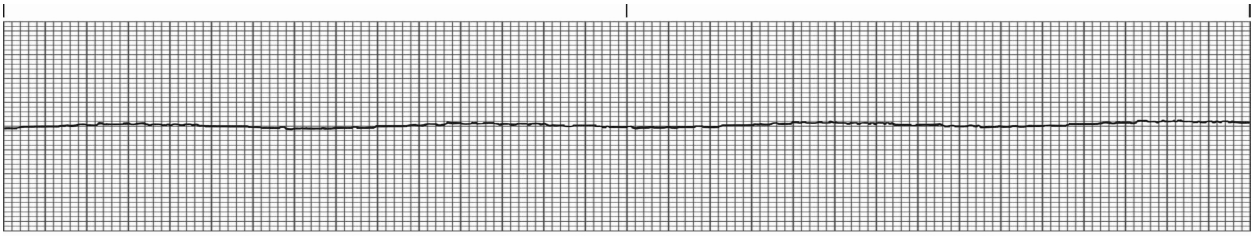
Medications for Pediatric Cardiac Arrest & Symptomatic Arrhythmias

Note: The standard recommendation is to have some type of pre calculated drug chart or length based tape for dosing.

Drug	Dose (pediatric)	Remarks
Adenosine	0.1mg/kg IV/IO (max 6 mg) Repeat dose 0.2mg/kg (max 12 mg)	Rapid IV/IO bolus & rapid 5-10 mL flush may cause transient asystole
Amiodarone (pulseless VT/VF)	5mg/kg IV/IO May repeat dose up to 2 times.	IV bolus maximum 300mg
Amiodarone (perfusing tachy rhythms)	Loading: 5mg/kg IV/IO over 20-60 min	Repeat to max 15mg/kg/day IV
Ativan (Lorazepam)	0.05-0.1 mg/kg IV/IO/IM	Max single dose 4mg
Atropine sulfate	0.02 mg/kg IV/IO ETT: 04-.06 mg/kg ETT is 2-3 times IV dose	Min dose: 0.1mg Max single dose 0.5mg
Ca^{2+} chloride 10%	20 mg/kg IV/IO (0.2ml/kg)	Give slowly
Dopamine Dobutamine	2-20 mcg/kg/min 2-20 mcg/kg/min	1600 mcg/ml concentration 2000 mcg/ml concentration
Epinephrine for arrest Or bradycardia	0.01mg/kg IV/IO *ETT: 0.1mg/kg (10 X's the IV dose)	Repeat every 3 – 5 min
Epinephrine infusion	0.1-1 mcg/kg/min	Concentrations: 0.1 mg/ml (100 mcg/ml) For 3-7 kg pts: 0.05 mg/ml (50 mcg/ml)
Glucose	0.5-1 g/kg IV/IO	10%= 5 -10ml/kg 25% = 2 - 4 ml/kg 50% = 1 – 2 ml/kg
Lidocaine	1mg/kg IV/IO	Equally acceptable as Amiodarone in vf/pvt
Lidocaine infusion	20-50mcg/kg/min After 1mg/kg loading dose	Concentrations: 4000 mcg/ml For 3 -7 kg pts: 8000 mcg/ml
Magnesium sulfate	25-50 mg/min IV/IO over 10-20 min	Max dose 2g
Naloxone	0.1mg/kg up to 2.0mg IV/IO/IM	Titrate to desired effect
Procainamide	15 mg/kg IV/IO	Give over 30 – 60 min
Sodium Bicarbonate	1mEq/kg per dose	Push slowly & only If ventilation is adequate
Valium (Diazepam)	0.1-0.3 mg/kg IV/IO or 0.5 mg/kg rectal	Max single dose 5 mg (rectal max single dose 10 mg)

*Endotracheal Tube (ETT) Meds: Lido, Epi, Atropine, Narcan and Vasopressin are acceptable as last resort

Recommended ETT Med Doses as follows:
Epinephrine @10 times the IV or IO route
Other drugs at 2-3 times the IV or IO route.



Pediatric Asystole

"Circle of Life"
Core Concepts of Resuscitation

Assess ABC's & Begin CPR
Attach monitor / defibrillator
Administer Oxygen
Continually provide CPR in 2 min cycles
30 compressions/2 breaths 1 rescuer
15 compressions/2 breaths 2 rescuer
Stop briefly every 2 min to assess

↓

[Secondary procedures]
Secure Airway when appropriate / Monitor CO_2
Obtain Vascular Access

Continually provide CPR in 2 min cycles then stop briefly to reassess rhythm

↓

Epinephrine (give within 5 min of start of compressions)
IV/IO: 0.01 mg/kg 1:10,000

↓

Repeat Epinephrine Q 3-5 minutes

↓

Identify & treat causes:

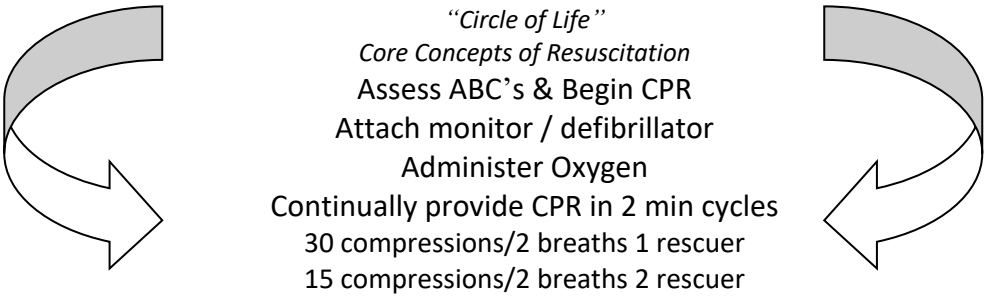
Anytime in the sequence

H's
Hypovolemia
Hypoxia
Hydrogen ions (acidosis)
Hypothermia
Hypo/hyperkalemia.
Hypoglycemia

T's
Toxins
Trauma
Tamponade (cardiac)
Tension pneumothorax
Thrombosis (pulmonary or coronary)
Too slow or too fast

Pulseless Electrical Activity

Could be any rhythm other than pulseless VF or VT



"Circle of Life"
Core Concepts of Resuscitation
Assess ABC's & Begin CPR
Attach monitor / defibrillator
Administer Oxygen
Continually provide CPR in 2 min cycles
30 compressions/2 breaths 1 rescuer
15 compressions/2 breaths 2 rescuer
Stop briefly every 2 min to assess

↓

[Secondary procedures]
Secure Airway when appropriate / Monitor CO_2
Obtain Vascular Access

↓

Epinephrine (give within 5 min of start of compressions)
IV/IO: 0.01 mg/kg 1:10,000

↓

Repeat Epinephrine Q 3 -5 minutes

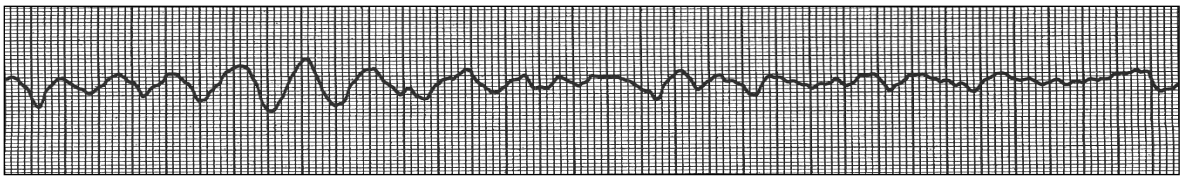
↓

Identify and treat causes:

Anytime in the sequence

H's
Hypovolemia
Hypoxia
Hydrogen ions (acidosis)
Hypothermia
Hypo/hyperkalemia.
Hypoglycemia

T's
Toxins
Trauma
Tamponade (cardiac)
Tension pneumothorax
Thrombosis (pulmonary or coronary)
Too slow or too fast



Pediatric Ventricular Fibrillation/Pulseless Ventricular Tachycardia

''Circle of Life''
Core Concepts of Resuscitation
Assess ABC's & Begin CPR
Attach monitor / defibrillator
Defibrillate 2 J/kg
Administer Oxygen
Continually provide CPR in 2 min cycles
Stop briefly every 2 min to assess and defibrillate

↓

[Secondary procedures]
Secure Airway when appropriate / Monitor CO_2
Obtain Vascular Access

↓

Defibrillate 4 J/kg 2 minutes after first defibrillation

↓

Epinephrine
IV/IO: 0.01 mg/kg 1:10,000

↓

Defibrillate 4 J/kg if VF or pulseless VT

↓

Amiodarone 5mg/kg IV or IO →

May consider:
Lidocaine 1mg/kg
(**equally effective as Amiodarone**)

or
Magnesium sulfate
25-50 mg/kg
ONLY if Torsades
or
hypomagnesemia
is suspected

↓

Defibrillate 4 J/kg if VF or pulseless VT

↓

Repeat Epinephrine every 3 -5 min at the same dose
Continue 2 min of CPR after each dose

↓

Defibrillate 4 J/kg

↓

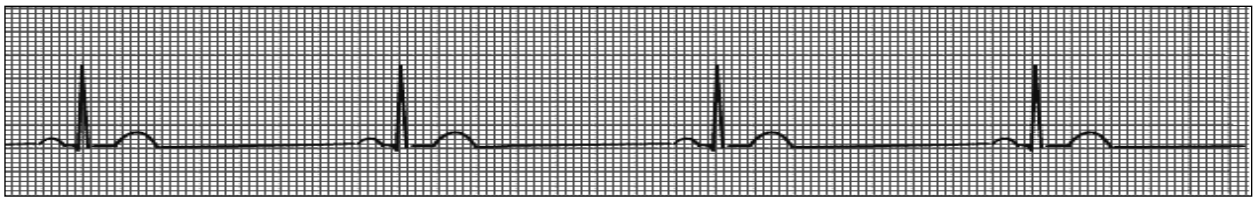
May repeat Amiodarone every 5 min up to 15mg/kg

↓

Defibrillate 4 J/kg
Identify and Treat causes between defibrillation

Anytime in the sequence:

H's-Hypovolemia, Hypoxia, Hydrogen ions (acidosis), Hypothermia, Hypo/hyper kalemia, Hypoglycemia
T's-Toxins, Trauma, Tamponade, Tension Pneumo, Thrombus (pulm or coronary), Too fast or too slow.



Bradycardia

Cardiopulmonary Failure

Bradycardia (below 60/min) with Agonal Breathing

Assess ABC's
Ventilate
Administer oxygen as needed
BVM/Intubate (1 ventilation every 2-3 seconds, over 1 sec)
Obtain vascular access
Assess vital signs

↓

Cardio-respiratory compromise?
Poor perfusion/altered mental status
Hypotension
Respiratory distress

↓

Yes

Perform chest compressions if despite oxygenation & ventilation: Heart rate <60/min

No

Observe
Support CAB's
Transport peds facility

Continue CPR until rate sustains at greater than 60 min, ideally over 80 - 100

↓

Epinephrine
IV/IO: 0.01 mg/kg 1:10,000

↓

Repeat Epinephrine every 3-5 minutes at same dose

↓

Atropine
0.02 mg/kg (usually not used in children < 1 year)
Min. dose:0.1 mg
Max single dose: 0.5 mg for child
1.0 mg for adolescent
May be repeated once

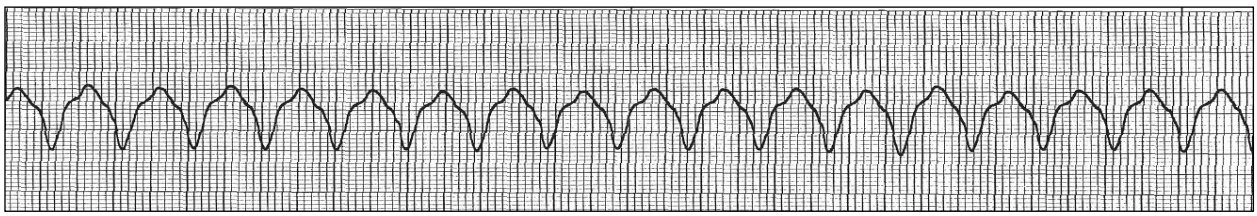
↓

Consider transthoracic/transvenous pacing

↓

Anytime in the sequence

Consider treatable causes:
Hypoxia
Increased vagal tone } the 2 most treatable causes
Hypoglycemia
Hypothermia
Herniation of brain stem



Wide Complex Tachycardia (>.09 sec)
Assumed to be
Ventricular Tachycardia, Stable
(no signs of shock)

Assess ABC's
Maintain airway
Oxygen, as needed
EKG and pulse oximeter
Assess vital signs

Consider 12 lead ECG and expert consult especially if stable

↓

Establish vascular access

↓

Amiodarone 5 mg/kg over 20-60 min

→ May consider:

Procainamide 15mg/kg over 30-60 min
or
Lidocaine 1mg/kg
(do not routinely administer multiple antiarrhythmic meds)

↓

Successful conversion?

Yes → Consider Expert Consult

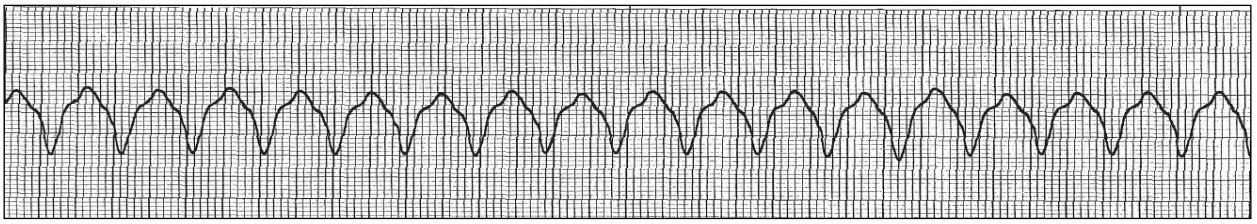
No ↓

Synchronized cardioversion 0.5 J/kg to 1 J/kg
(may increase to 2 J/kg)

↓

Consider Expert Consult

May choose to try one dose of adenosine 0.1mg/kg to determine if the rhythm is SVT with aberrancy.



Wide Complex (>.09 sec)
Assumed to be
Ventricular Tachycardia, Unstable

(signs of poor perfusion / shock)

Assess ABC's

Maintain airway
Oxygen, as needed
EKG & pulse oximeter
Assess vital signs
Code equipment prepared

Expert Consult & 12 lead ECG when available

↓

Immediate synchronized cardioversion
0.5-1.0 J/kg
(consider sedation, do not delay cardioversion)

↓

Attempt 2nd synchronized cardioversion up to 2J/kg

↓

If unsuccessful or rapid reoccurrence

↓

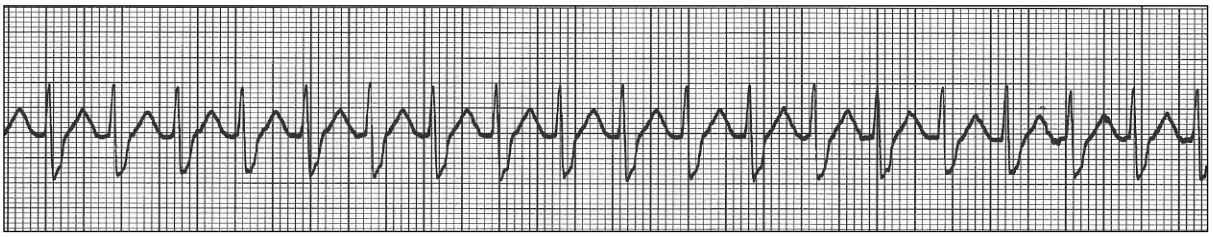
May consider:

Amiodarone 5mg/kg IV
over 20-60 min
or
Procainamide 15mg/kg IV
over 30-60 min
(do not routinely
administer multiple
antiarrhythmic meds)

↓

Then a 3rd synchronized cardioversion up to 2 J/kg

Rate: over 180 for children; over 220 for infants



Narrow Complex Tachycardia

Assumed to be

Supraventricular Tachycardia, <u>Stable</u>

Assess ABC's

Maintain airway

Oxygen, as needed

EKG & pulse oximeter

Assess vital signs

Consider 12 lead ECG & expert consult

↓

Vagal maneuvers

(ice or straw)

↓

Establish vascular access

↓

Adenosine 0.1 mg/kg IV rapidly

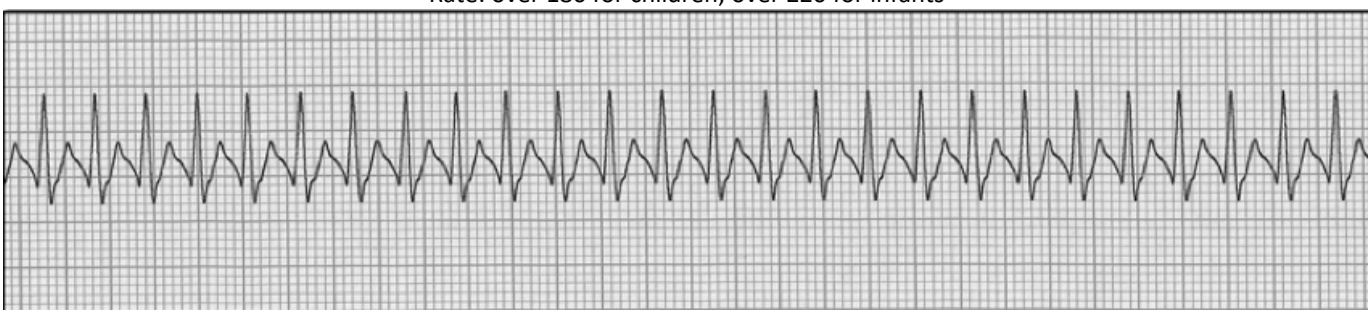
Followed by rapid flush

(may double dose and repeat x 1)

↓

Expert pediatric consult asap

Rate: over 180 for children; over 220 for infants



Narrow Complex Tachycardia
Supraventricular Tachycardia, Unstable

(signs of poor perfusion / shock)

Assess ABC's
Maintain Airway
Oxygen, as needed
Assess vital signs
Code equipment prepared

Consider 12 lead ECG & expert consult when appropriate

↓

Consider vagal maneuvers
if not critically unstable
(ice or straw)

↓

If IV/IO is already in place critical
Adenosine 0.1mg/kg IV rapidly
followed by rapid flush
OR

↓

Synchronized cardioversion
0.5 - 1.0 J/kg
Sedate if possible (must not delay cardioversion)

↓

If unsuccessful
2nd synchronized cardioversion up to 2 joules/kg

↓

Then a 3rd synchronized cardioversion up to 2 J/kg

May consider:

Amiodarone 5mg/kg IV over 20-60 min
or
Procainamide 15mg/kg IV over 30-60 min
(do not routinely administer multiple antiarrhythmic meds)

Pediatric Shock
Poor perfusion pre or post resuscitation

Hypoperfusion from any cause

Assess ABC's

Maintain Airway

Administer Oxygen, as needed

Maintain body temperature

Monitor EKG & Pulse oximetry- frequent BP

Emergency Vascular Access (IV or IO)

Always assess for and treat hypoglycemia, hypocalcemia, and acidosis
(Check lactate, hemoglobin and PaO2 levels,)

ASSESS FOR AND MAINTAIN AN ADEQUATE HEART RATE AND RHYTHM

Shock from Trauma

↓

20 ml/kg NS or LR Rapidly

↓

Continued signs of poor perfusion

↓

20 ml/kg NS or LR Rapidly

↓

Continued signs of poor perfusion

↓

3rd infusion of 20 ml/kg NS/LR

or

PRBC's in 10mL/kg boluses
or, Whole blood 20mL/kg
Repeat Q 20-30 min as needed

↓

Address the problem (surgery?)
and administer whole blood

Cardiac Related Shock
(enlarged liver & JVD)

↓

5-10ml/kg NS or LR slowly
(provided lungs are clear)

↓

Continued signs of poor perfusion

↓

Along with 2nd fluid bolus
consider:

↓

Dopamine at 10 – 20 mcg/kg/min

or

Epinephrine 0.1 – 1mcg/kg/min
NorEpi 0.1 – 2 mcg/kg/min

↓

Expert consultation

Septic Shock

↓

10-20 ml/kg NS or LR (*5-20 min)*
3 – 4 x's in the first hour
Correct Glucose and Calcium level
Give broad spectrum antibiotic
within 1 hour-blood cultures, first

↓

Transfer to specialized ICU for
hemodynamic monitoring

↓

Consider:
Epinephrine 0.1 – 1 mcg/kg/min
or NorEpi 0.1 – 2 mcg/kg/min

↓

ICU options based Scv02 & B/P
*Norepinephrine/vasopressin
*Dobutamine or Dopamine
*Consider stress-dose
hydrocortisone

Fluid-refractory septic shock-means it does not respond to fluid therapy.

Pediatric Post Resuscitation Care

Return of Spontaneous Circulation (ROSC)

Optimize oxygenation and ventilation

Appropriate ETT placement-cuff preferred
end tidal CO_2 or capnography – tube is in airway

CXR – depth of insertion
Maintain O2 sat 94-99%
ensures adequate oxygenation
prevents risk of reperfusion injury related to excessive oxygen
Ventilate to maintain CO2 levels appropriate to patient's condition
monitor indirectly by capnography
monitor directly by ABG

Optimize cardiac output - *Cardiac output = stroke volume x heart rate*
Stroke volume is determined by preload, contractility, and afterload

Ensure adequate mean arterial output (MAP) (when able to monitor)

Increase preload by administering isotonic fluid boluses

May not tolerate 20mL/kg due to poor myocardial function post arrest; try 5-10mL/kg over 10-20 min
Improve contractility by correcting hypoglycemia and/or electrolyte imbalances including hypocalcemia
Inotropes (dopamine) and/or Inodilators (milranone) may be needed
Avoid hypotension – treat with fluids and/or vasopressors
Maintain HR appropriate for age – aggressively treat any tachy or brady arrhythmias
Maintain adequate hemoglobin concentrations

Optimize neurologic outcome

Aggressively treat hyperthermia, hypotension, hypo/ hyperglycemia, and hypoxia
all of which can cause secondary brain injury.

Aggressively treat seizures which may result from: hypoglycemia, electrolyte imbalance, or underlying brain injury. Seizures increase the metabolic demand; correct the cause if possible.

Watch for (PCAS) Post Cardiac Arrest Syndrome=systemic inflammation
Fever, hypotension, multiorgan failure, hyperglycemia, infection

Transport as needed for most appropriate level of care.

Post Cardiac Arrest- Induced Targeted Temperature Management (TTM):
For the resuscitated child who remains comatose, TTM *may be beneficial*. **(32 – 36°C / low 90's F)**
Consider using a target in the range of 32-34°**C**, followed by 36-37.5°**C** –or only use 36-37.5°**C** for comatose pediatric patients who achieved ROSC.
→should not be initiated in the prehospital setting

Special Needs Children

Medical and technological advances have allowed critically ill or injured children to live longer lives. Many of these 12 million children will be encountered at home, in schools, or in non-medical care facilities.

These patients present special challenges in assessment and management. The caretaker can be a great help in determining what is "normal" and what is unique for this particular patient.

Common technological support includes tracheostomies, ventilators, CSF shunts and gastrostomy tubes. Troubleshooting complications with these devices can be accomplished using a modified version of the DOPE mnemonic for evaluating ET tubes.

Tracheostomy Tubes

The patient may or may not have a patent upper airway allowing ventilation or oral intubation in the emergency setting. Another trach tube or a standard ET tube can be placed in the stoma if needed. Possible complications:

- **D** – **dislodged tube**
- **O** – **obstructed tube**
- **P** – **pneumothorax**
- **E** – **equipment failure**

Home Ventilators

The caregiver should be familiar with the ventilator type, function and settings for the child. Identifying and treating the causes of acute respiratory distress in the ventilator dependent patient must be done immediately. Possible causes of the deteriorating child who is ventilator dependent may include:

- **D** – **displaced or disconnected tubing or ET or trach tube**
- **O** – **obstruction of air flow** – **ventilator or trach tube**
- **P** – **pneumothorax or patient condition (i.e.** – **respiratory diseases)**
- **E** – **equipment failure** – **try to manually ventilate the patient**

Central Venus Catheters

These sites may have external ports requiring regular "flushing" or be placed under the skin showing a visible "port" which must be accessed through the skin and require monthly "flushing".
Common causes of CVC related complications include:

- **D** – **displacement or disconnection causing serious bleeding**
- **O** – **obstruction** – **clots or kinking of the catheter**
- **P** – **pulmonary embolus, pneumothorax, pericardial tamponade**
- **E** – **equipment failure** – **leaking, cracking or infection**

Feeding Tubes

Used for nutrition or medications in children who have nutritional, developmental or swallowing problems.
Potential complications for feeding catheters include:

- **D** – **displacement**
- **O** – **obstructed**
- **P** – **peritonitis, perforation, pneumoperitoneum**
- **E** – **equipment failure** – **the tubing or the feeding pump**

CSF Shunts

Used in patients who are unable to drain or reabsorb CSF from the ventricles in the brain. This may be due to medical conditions, trauma or neoplasms. The shunt is a catheter placed in the brain, which drains fluid to the abdominal or thoracic cavity for reabsorbtion. Emergencies involving CSF shunts may include:

- **D** – **displacement** – **patient may show signs of ↑ ICP**
- **O** – **obstruction** – **SI/SX include headache irritability, N/V, bulging fontanelle are signs of ↑ ICP**
- **P** – **peritonitis, perforation, pseudo cyst** – **all presenting as acute abdomen or shock**
- **E** – **equipment failure** – **leaking, kinking or cracking of the shunt causing signs of infection or ↑ ICP**

Supplemental Info
Common Pediatric Emergencies

Seizures

Most common pediatric medical emergency
Fever is the most common cause

- Febrile seizures alone are not life threatening (but how do you know fever is truly the cause?)
- No alcohol or cool baths – these can lead to shivering and increase temp.

Status Epilepticus – 2 or more seizures without regain in consciousness or 1 continuous seizure lasting more than 15-20 minutes.

Treatment

ABC's
Prevent Injury, Lateral recumbant position (for airway maintenance)-
Vascular access if unstable or in status seizures
Ativan IM or IV, IO (0.1mg/kg)
Midazolam IV,IN, IM, IO (0.1mg/kg)
Valium IV, IO (0.1-0.2mg/kg) or rectal (0.5mg/kg) or
Post seizure- may need to reposition and insert an oral airway & provide BVM if unresponsive.
Most seizures last less than 5 minutes and need no treatment except opening the airway, suction, and O2

Fever

Remove clothing
Tylenol (15mg/kg) or Motrin (10mg/kg)

AVPU Pediatric Response Scale
Rapid evaluation of cerebral cortex function:
Alert- awake and appropriate
Voice- responds only to voice
Painful- responds only to painful stimuli
Unresponsive- no response to stimuli

Sepsis

Initially manage shock and fever
Appropriate antibiotics
Consider sepsis specific facility

Meningitis

Watch for S/S of increased ICP
May be life threatening if not caught early

Symptoms

Fever (may be only presenting symptom in infant)
Bulging fontanel
Irritability
Lethargy
Nuchal rigidity
S/S increased ICP

Treatment

Initially manage shock, ICP, and fever
Appropriate labs
Appropriate antibiotics

Head Injuries

Common in Pediatrics – large head compared to body

Concussion

Pathophysiology
Swelling – no actual damage to brain tissue

Assessment

Vomiting
Sleepiness---with altered mental status, always check glucose!
Neuro checks WNL

Management

CAB's
Observe for:

- S/S increased ICP
- S/S hemorrhage/contusion

Sudden Unexpected Infant Death (SIDS)

CDC suggests using the term SUID (Sudden Unexpected Infant Death) to describe *all* sudden unexpected infant deaths that often occur while the infant is sleeping. It is estimated that about 3500 infant lives are lost each year to sudden death.

The American Academy of Pediatrics (AAP) Website has additional information on this topic to help reduce the risk of sleep related deaths.

Intracranial Hemorrhage/Contusion

Pathophysiology- Bleeding within the brain tissue

Assessment

S/S of concussion + neuro deficits
Lethargy or loss of consciousness
Seizures
Unequal or sluggish pupils
Hemiparesis, hemiparalysis

Management

ABC's
Close observation
Surgical intervention

Increased Intracranial Pressure

Assessment (Cushing's Triad)

Hypertension
Bradycardia
Irregular respirations

Management

ABC's
Consider elevating head; maintain the head in midline position
Maintain adequate ventilations ($paCO_2$ approx. 30)
Hyperventilation reserved for rapidly deteriorating patients (may need rapid surgical intervention)
Corticosteroids
Mannitol and Hypertonic saline may be considered by some if no bleed

Respiratory Distress

"Noisy breathing is obstructed breathing"

Managing the respiratory distress is more important than diagnosing

Croup
Usually < 3 yrs old
Infection
"Sick" for a couple of days
Low grade fever
Not "toxic" appearing

Epiglottitis
Usually 3-6 yrs old
Drooling/dysphagia
Sudden onset
High fever
"Toxic" appearing
"Tripod"

Upper Airway Obstruction-other may be caused by swelling, or foreign body obstruction or anaphylaxis(nuts, bee stings etc.)

Both croup and epiglottitis could have:
Stridor
"Barky" cough

Tension Pneumothorax:
Can be a complication of aggressive BVM, trauma or certain lung diseases. Watch for severe dyspnea, diminished or absent breath sounds on 1 side, JVD, tachycardia and hypotension.

Asthma
RAD (reactive airway disease) – bronchoconstriction
Tightness reduces airflow and thus may decrease wheezing

Pneumonia / Bronchiolitis
Infiltrates
Respiratory distress with coarse breath sounds, rales, rhonchi, and possibly wheezing
Wet 'junky' cough (bronchiolitis)

General management
Psychological first aid (keep Pt. calm)
Airway as appropriate – position of comfort ⟶ sniffing position
O_2 as tolerated – blow by ⟶ BVM ⟶ ETT
Suction, if indicated
Pulse oximeter, cardio-respiratory monitor
Initial IV therapy may be delayed
Nebulizer treatments

- Bronchodilators, for asthma, and possibly pneumonia and bronchiolitis
  - (Albuterol 1.25-2.5 mg/dose)
- Racemic epinephrine 0.05mL/kg/dose for croup (not used for epiglottitis)

Steroids for croup

American Red Cross
Pediatric Advanced Life Support
Pre-Course Self-Assessment

1. You are called to evaluate a 7 year-old unresponsive girl. How long should you take to *simultaneously* check for breathing
and pulse?
A. Not more than 5 seconds
B. Not more than 20 seconds
C. Not more than 15 seconds
D. Not more than 10 seconds

2. What is a side effect of Adenosine treatment?
A. SVT
B. Transient asystole
C. Vomiting
D. Hypertensive crisis

3. A 4 year old child with a 3 day history of vomiting, diarrhea, and poor PO intake is brought into the ER. She is afebrile, heart rate is 132, respirations are 22 and unlabored, capillary refill is 5, central pulses are present, peripheral pulses are weak, blood pressure is 80/52.
You determine that this child is most likely in:
A. Hypovolemic shock
B. Obstructive shock
C. Distributive, septic shock
D. Cardiogenic shock

4. Hypotension, diminished peripheral pulses and acutely altered mental status are classic signs of?
A. RSV
B. Concussion
C. Inadequate perfusion
D. Bronchiolitis

5. You respond to a skate park where a 9 year-old has fallen from one of the ramps and is complaining of dyspnea and chest
pain upon inspiration. There are noticeably diminished breath sounds to the left lung and neck vein distention present.
What do you suspect?
A. Tension pneumothorax
B. Pulmonary embolism
C. Cardiac tamponade
D. Esophageal tear

6. Post resuscitative care includes monitoring the patient's O2 saturation. What should the target goal be?
A. 94-99%
B: 95-100%
C. >94%
D. >97%

7. An endotracheal tube (ETT) has been placed in a 4 year-old drowning victim. How would you confirm placement?

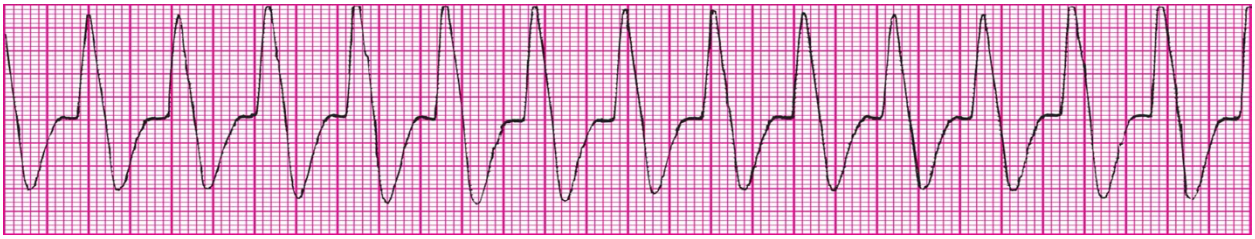
utilize to confirm tube placement

A. Review capnography results.
B. Observe for bilateral chest rise
C. Auscultate the lungs and epigastric areas for air movement.
D. all of the above

8. In post cardiac arrest care, the focus shifts initially to ensuring adequate oxygenation and ventilation and then rapidly continues on to emphasize which of the following?

A. Provide targeted temperature management for 24 hours
B. Analyze EEG rhythms to observe for brain activity
C. Ensure mean arterial pressure (MAP) to maintain palpable pulses and systemic perfusion
D. Aggressively manage hyperglycemic indexes

9. You are the team leader during a resuscitation attempt on a 7 year old child. The monitor is just applied and shows the following rhythm. There is no pulse.



What is this rhythm? .

A. Third degree heart block
B. Monomorphic pulseless ventricular tachycardia
C. Coarse v. fib
D. Supra ventricular tachycardia (SVT)

10. Which of the following is not an element of high quality pediatric CPR?

A. Compression rate of 100-120/min, at a depth of 2 “
B. Compression depth of 1/4 the depth of the chest
C. Allowing complete recoil between compressions
D. Giving 15 compressions followed by 2 ventilations; each lasting about 1 second.

11. The key components of debriefing include all of the following points except which one?

A. Evaluating if the ICU bed could be put to more appropriate use a more viable patient.
B. Evaluation and discussion of the data and the interventions.
C. Summary of the event.
D. Identification of ways to improve future events.

12. A child in the ED presents with petechiae on his torso area. His dad says the child has been running a high temp for 24 hours, and is now having trouble breathing. What might you initially suspect?

A. Measles
B. Distributive, neurogenic shock
C. Serious systemic infection/ sepsis
D. Chickenpox

13. Which of the following is not a consistent feature - but may be a late and very ominous sign of shock in children?

A. Hypotension
B. Tachycardia
C. Seizures
D. Increased capillary refill

14. A child with a chronic muscular dystrophy is having difficulty breathing. He is on oxygen and has adequate respiratory
drive, but lung sounds are congested. What is the first priority in caring for this patient?
A. Administer 5 back blows
B. Suction to clear the airway
C. Provide supplemental respirations with a bag valve mask device
D. Draw stat blood cultures for broad spectrum antibiotic coverage

15. What should a child with suspected sepsis receive within a short time of arrival to the ER?
A. Cardiology consult
B. Chest x-ray
C. Neurology consult
D. Broad spectrum antibiotic

16. Which one is **not** an indicator to review when assessing a child's circulation in the Patient Assessment Triangle (PAT)?
A. Flushing of the skin
B. Skin pallor (dusky or gray color)
C. Accessory muscle use
D. Evidence of bleeding

17. You are assessing a child with respiratory distress. Which sign relating to his circulation may be present?
A. Rash to the extremities
B. Bradycardia
C. Pallor
D. Chills

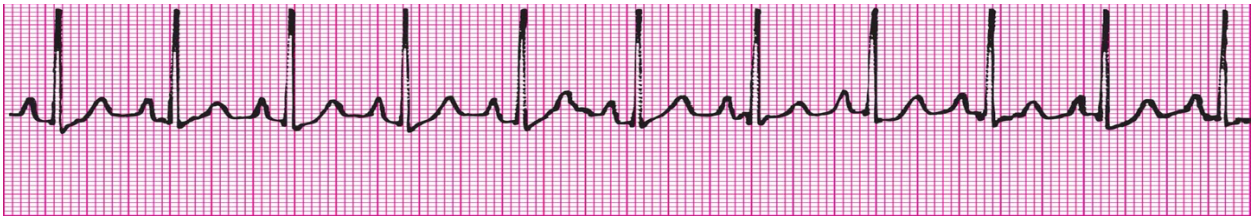
18. What is the primary goal for all types of pediatric shock?
A. Restore the patient to sinus rhythm
B. Balance oxygen delivery and demand
C. A successful neuro exam
D. achieve a systolic blood pressure over 100 mm/Hg

19. A 1 year old child is in cardiac arrest and does not have an IV site. What is your best intervention?
A. Immediately insert an IO
B. Give epinephrine via the ETT
C. Have 2 people try simultaneously to start an IV
D. Ask the doctor to insert a central line

20. Severe anaphylaxis (hives, wheezing, angioedema) is initially treated with which of the following?
A. Atropine
B. Steroids
C. Epinephrine
D. Antihistamines

21. Your patient is a 3 year old girl with watery stools and vomiting for 2 days. She is alert and her VS appear stable.

You attach a monitor and the following rhythm is displayed:



A. Supraventricular tachycardia
B. Atrial Flutter
C. Ventricular tachycardia
D. Sinus tachycardia

22. Immediate treatment for unstable ventricular tachycardia with a pulse is:
A. Start an IV, give adenosine slow IV push
B. 20mL/kg normal saline bolus
C. Defibrillation
D. Synchronized cardioversion

23. Which part of the PAT triangle uses the mnemonic TICLS (tone, interactivity, consolability, look, speech)?
A. Appearance
B. Work of Breathing
C. Exposure
D. Circulation

24. Which of the following are indicators of increased work (effort) of breathing in a child with respiratory distress?
A. Accessory muscle use
B. Intercostal, suprasternal or substernal retractions
C. Nasal flaring
D. All of the above

25. A 2 year-old is experiencing signs of tachycardia and tachypnea. Liver enlargement and neck vein distention is apparent.

What type of shock does this represent??
A. Cardiogenic
B. Distributive
C. Obstructive
D. Hypovolemic

26. A 7 year-old collapses on the playground. Pulses are absent. The monitor displays the following rhythm:

What rhythm is this?
A. Ventricular fibrillation
B. Torsades de pointes
C. Atrial flutter
D. Third degree heart block

27. Hallmarks of bronchiolitis include?

A. Increased inspiratory effort with sternal retractions.
B. Stridor, drooling and voice change
C. lethargy, 'head bobbing' and cyanosis.
D. wet "junky" cough, grunting and a recent history of RSV infection.

28. A 5 year-old presents with gasping respirations and pulse of 65. What is your next action?

A. Fluid bolus with 20mL/kg normal saline.
B. Cardioversion with 0.5-1 J/kg
C. Provide 1 bag-mask ventilation every 2-3 seconds; watch for partial chest rise.
D. Administer Narcan

29. Which of the following is indicative of respiratory failure in a 9 year old child?

A. Productive cough with inspiratory crackles (rales) heard on auscultation
B. Diminished breath sounds, bradycardia, slow respirations, low oxygen level, high C02
C. Prolonged expiratory phase with end expiratory wheezing heard on auscultation, low C02
D. Respiratory rate of 32 with accessory muscle use

30. A 3 year old boy is brought in to the ER by dad with a 2 day history of croup. Which of these are considered first?

A. Albuterol, with or without ipratropium
B. Broad spectrum antibiotic
C. Nebulized epinephrine and Corticosteroids
D. Tylenol with codeine

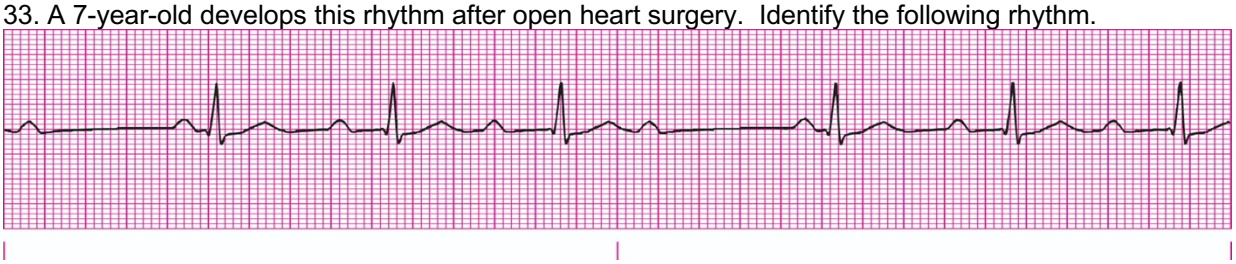
31. What first line medication would be indicated for an asthma occurrence that requires treatment?

A. Albuterol, with or without ipratropium
B. Broad spectrum antibiotic
C. Nebulized epinephrine and Corticosteroids
D. Tylenol with codeine

32. A 6 yr old child is found unresponsive on the playground. What should the school nurse do first?

A. Defibrillate
B. Check the blood glucose
C. Chest compressions
D. Rapid Assessment

33. A 7-year-old develops this rhythm after open heart surgery. Identify the following rhythm.



A. Atrial Fibrillation
B. PEA
C. Second-degree atrioventricular (AV) block, type I
D. First degree heart block

34. You are evaluating an 8 y.o. in the ED for a potential septic shock diagnosis. Which lab tests will most likely confirm that diagnosis?

A. Electrolytes and a liver panel
B. CEA and refractory protein study
C. full panel toxicology screen
D. Lactate level, CBC and blood cultures

35. A lethargic 2 year old is brought into the ER by her mom in septic shock (systemic infection). She has received fluid boluses but remains with cool mottled extremities, a narrow pulse pressure with diminished pulses. What do you suspect?

A. Fluid refractory shock
B. Hypertensive crisis
C. The child is going into anaphylactic shock
D. Congestive Heart Failure

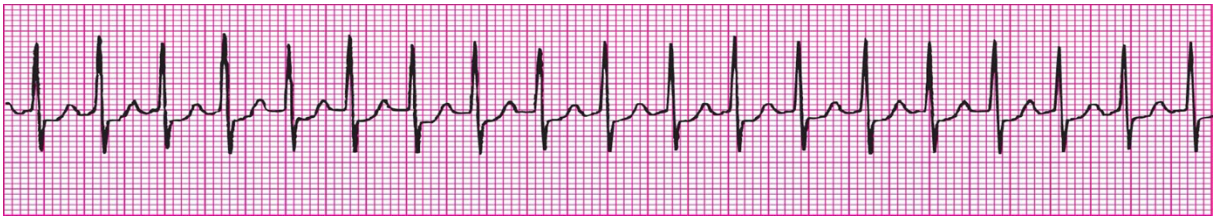
36. Which common childhood illness often presents with audible inspiratory stridor and a barky cough??

A. Strep throat
B. Asthma
C. Pneumonia
D. Croup

37. When treating a child in shock, what are some signs of imminent cardiac arrest??

A. Hypertension, bounding central pulses
B. Progressive heart murmur, elevated temp
C. Hypotension, bradycardia, diminished central pulses
D. Tachycardia, stridor and elevated white blood count

38. A 10 year-old child in the Emergency Dept. presents in this rhythm. There is a weak pulse. The patient is hypotensive, but alert. An IV is in place.



What is this rhythm?

A. Junctional
B. Supraventricular tachycardia
C. Sinus tachycardia
D. 2nd degree block-type II

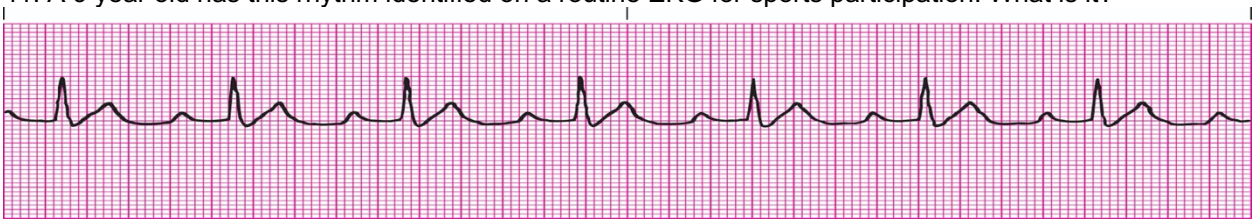
39. Your priority in SVT with poor perfusion and an IV in place is:

A. Defibrillate at 2 J/kg
B. Fluid bolus of 20mL/kg over 5-10min
C. Synchronized cardiovert at 2 J/kg
D. Administer adenosine 0.1mg/kg

40. If adenosine is not effective in treating SVT and the patient shows poor perfusion, what would you do next?

A. Defibrillate at 4 J/kg
B. Fluid bolus of 20mL/kg over 5-10min
C. Synchronized cardiovert at 0.5-1 J/kg
D. Administer adenosine 0.1mg/kg

41. A 9 year old has this rhythm identified on a routine EKG for sports participation. What is it?



A. First degree AV block
B. Second degree AV block, type 1
C. Junctional Rhythm
D. None of the above

42. Which of the following interventions might be prioritized for a pediatric patient with increased intracranial pressure?
A. Hyperstimulation therapy to maintain an awake state.
B. Give hypotonic fluids rapidly for best response.
C. Maintain Trendelenburg position for the first 24 hours.
D. Place the head in midline position.

43. The initial indicated therapy for a child who has SVT with a rate of 188, and stable is?
A. Synchronized cardioversion
B. Vagal maneuvers
C. Defibrillation
D. IV Atropine

44. A child is experiencing post-cardiac arrest syndrome (PCAS). Which of the following symptoms might suggest this
ischemic/reperfusion syndrome is occurring?
A. Hypotension
B. Fever
C. Hyperglycemia
D. All of the above

45. Which medication is indicated for a child with bradycardia (rate 36), who is receiving compressions, but not improving?
A. Epinephrine
B. Amiodarone
C. Narcan
D. Adenosine

46. Which of the following tools are used to monitor the efficiency of chest compressions in an intubated child?
A. Presence of arterial waveform (with an indwelling catheter)
B. The patient's improving color
C. End tidal CO_2 levels
D. Both A & C

47. In a child experiencing ROSC, which of the following would the team provide to optimize preload and restore intravascular
volume?
A. Isotonic fluid boluses
B. TPN
C. Rapid hypotonic fluids
D. Packed RBC's

48. What is the dose of Epinephrine that should be given in an arrest situation?
    A. 1 mg/kg every 5 minutes
    B. 0.5 mg/kg every 3-5 min.
    C. 0.01 mg/kg every 3-5 min
    D. 0.25mg/kg in a titrated bolus.

49. The fastest way to calculate code medications in an arrest situation when you don't know the weight of the child is?
    A. Weigh the child
    B. Use a length- based resuscitation tape.
    C. Call the pharmacist for help
    D. Estimate the medication dosage based on half the adult dose

50. Pulseless V Tach and V fib are 2 rhythms that respond best to early defibrillation. What is the initial setting for defibrillation in the pediatric population?
    A. 4 J/kg
    B. 20 J/kg
    C. 2 J/kg
    D. 10 J/kg

PALS Pretest 2022

*Page Referencess are for the EMC 2022 PALS Prep Packet

Name: _____

Date: _____

Location: _____

	Prep-Packet		Prep-Packet
1. A B C D E	Pge 14	26. A B C D E	Pge 35
2. A B C D E	Pge 17	27. A B C D E	Pge 31
3. A B C D E	Pge 10	28. A B C D E	Pge 9
4. A B C D E	Pge 10	29. A B C D E	Pge 9
5. A B C D E	Pge 31	30. A B C D E	Pge 31
6. A B C D E	Pge 9	31. A B C D E	Pge 31
7. A B C D E	Pge 9	32. A B C D E	Pge 18
8. A B C D E	Pge 27	33. A B C D E	Pge 36
9. A B C D E	Pge 33	34. A B C D E	Pge 26
10. A B C D E	Pge 14	35. A B C D E	Pge 26
11. A B C D E	Pge 7	36. A B C D E	Pge 31
12. A B C D E	Pge 10	37. A B C D E	Pge 10
13. A B C D E	Pge 10	38. A B C D E	Pge 37
14. A B C D E	Pge 31	39. A B C D E	Pge 25
15. A B C D E	Pge 10	40. A B C D E	Pge 25
16. A B C D E	Pge 8	41. A B C D E	Pge 37
17. A B C D E	Pge 9	42. A B C D E	Pge 30
18. A B C D E	Pge 10	43. A B C D E	Pge 24
19. A B C D E	Pge 10	44. A B C D E	Pge 27
20. A B C D E	Pge 10	45. A B C D E	Pge 21
21. A B C D E	Pge 34	46. A B C D E	Pge 7
22. A B C D E	Pge 25	47. A B C D E	Pge 7
23. A B C D E	Pge 8	48. A B C D E	Pge 12
24. A B C D E	Pge 9	49. A B C D E	Pge 17
25. A B C D E	Pge 26	50. A B C D E	Pge 20