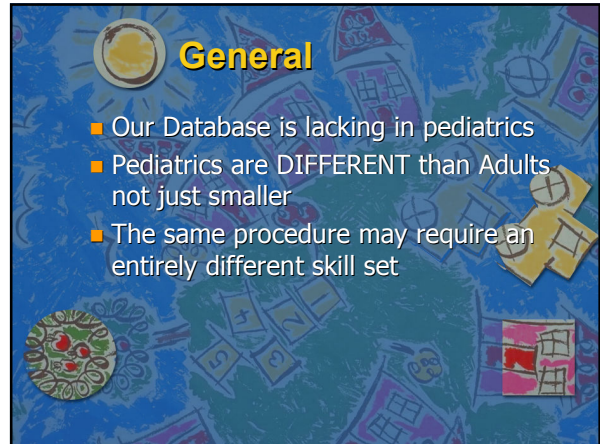


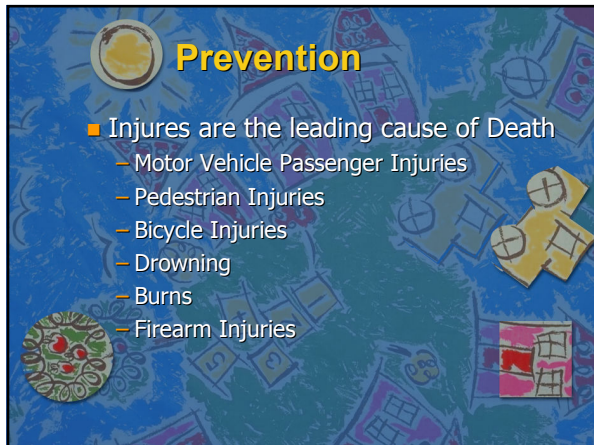
Pediatric Advanced Life Support Overview 2006

Judy Haluka
BS, RCIS, EMT-P



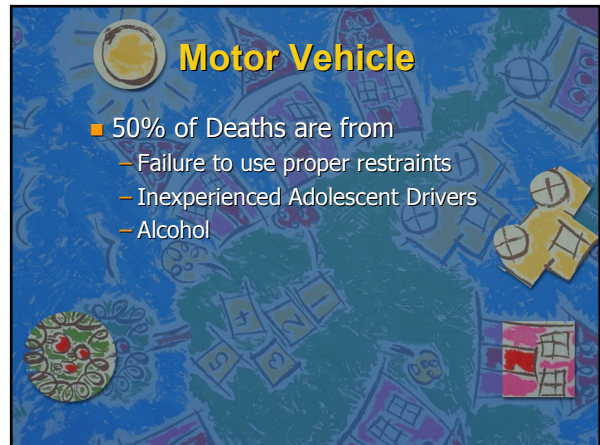
General

- Our Database is lacking in pediatrics
- Pediatrics are DIFFERENT than Adults, not just smaller
- The same procedure may require an entirely different skill set



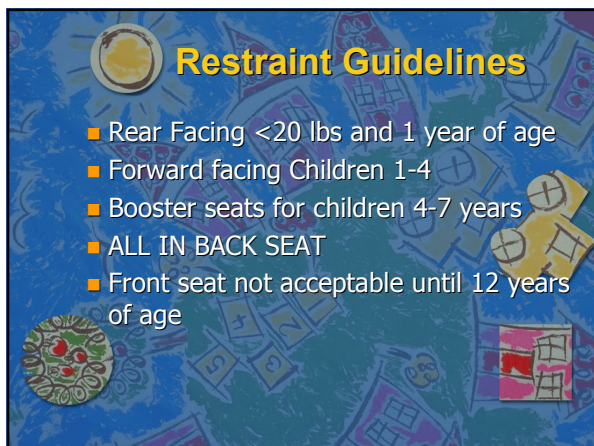
Prevention

- Injuries are the leading cause of Death
 - Motor Vehicle Passenger Injuries
 - Pedestrian Injuries
 - Bicycle Injuries
 - Drowning
 - Burns
 - Firearm Injuries



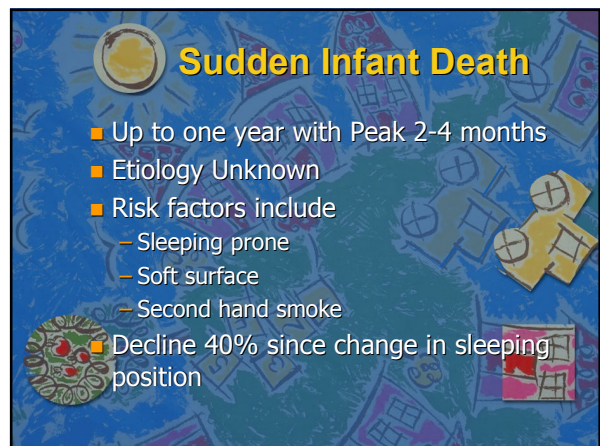
Motor Vehicle

- 50% of Deaths are from
 - Failure to use proper restraints
 - Inexperienced Adolescent Drivers
 - Alcohol



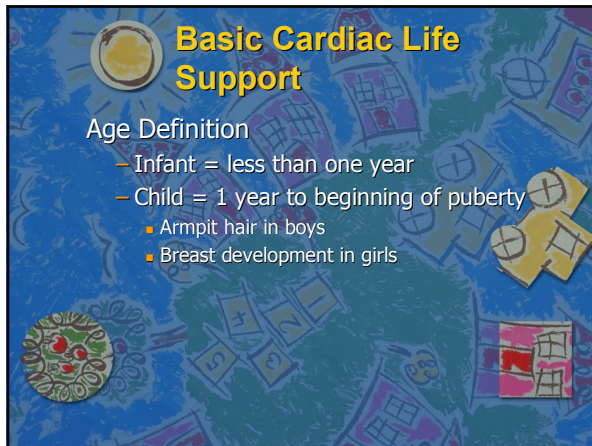
Restraint Guidelines

- Rear Facing <20 lbs and 1 year of age
- Forward facing Children 1-4
- Booster seats for children 4-7 years
- ALL IN BACK SEAT
- Front seat not acceptable until 12 years of age



Sudden Infant Death

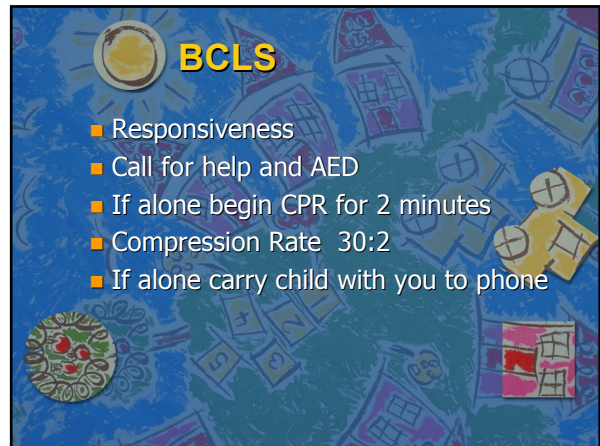
- Up to one year with Peak 2-4 months
- Etiology Unknown
- Risk factors include
 - Sleeping prone
 - Soft surface
 - Second hand smoke
- Decline 40% since change in sleeping position



Basic Cardiac Life Support

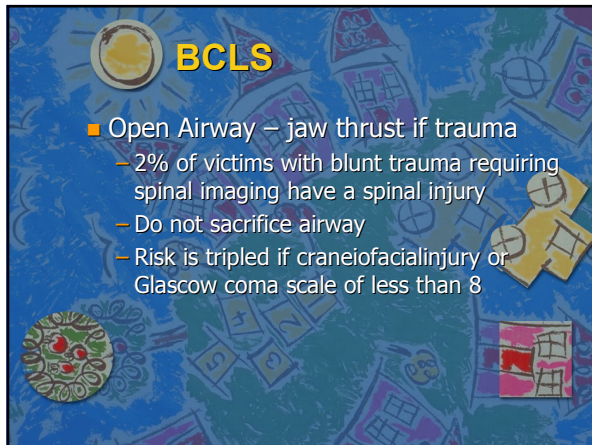
Age Definition

- Infant = less than one year
- Child = 1 year to beginning of puberty
 - Armpit hair in boys
 - Breast development in girls



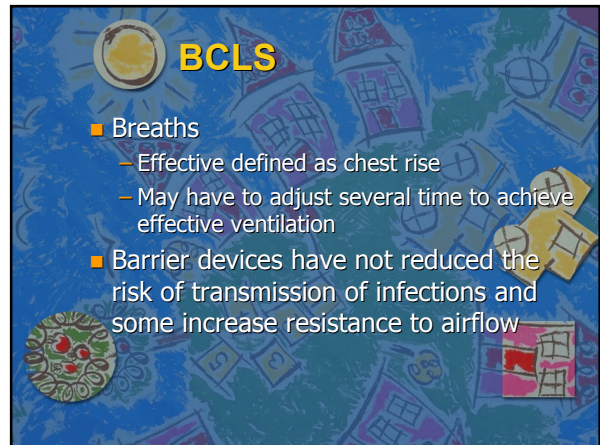
BCLS

- Responsiveness
- Call for help and AED
- If alone begin CPR for 2 minutes
- Compression Rate 30:2
- If alone carry child with you to phone



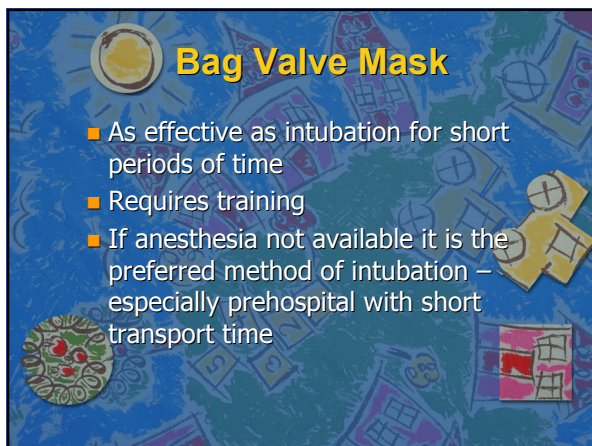
BCLS

- Open Airway – jaw thrust if trauma
 - 2% of victims with blunt trauma requiring spinal imaging have a spinal injury
 - Do not sacrifice airway
 - Risk is tripled if craneiofacial injury or Glasgow coma scale of less than 8



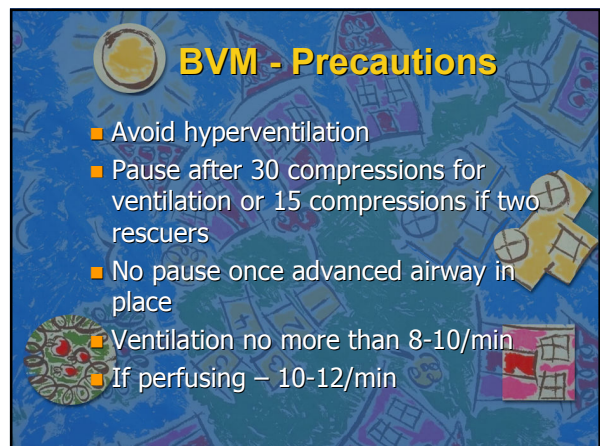
BCLS

- Breaths
 - Effective defined as chest rise
 - May have to adjust several time to achieve effective ventilation
- Barrier devices have not reduced the risk of transmission of infections and some increase resistance to airflow



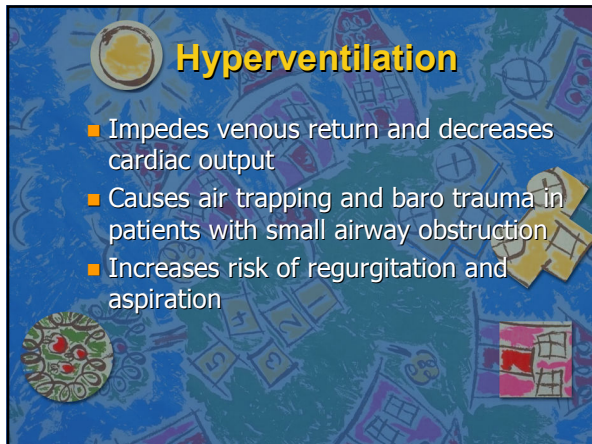
Bag Valve Mask

- As effective as intubation for short periods of time
- Requires training
- If anesthesia not available it is the preferred method of intubation – especially prehospital with short transport time



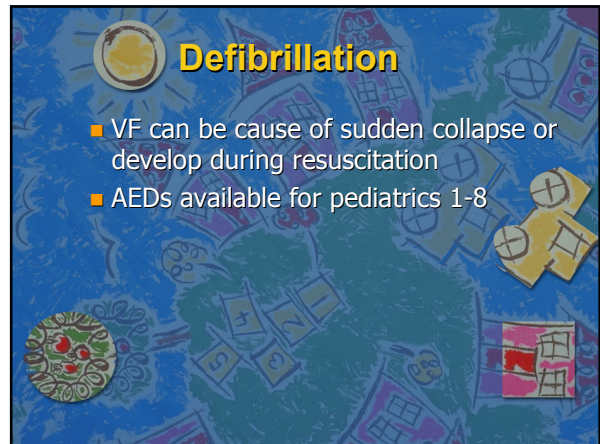
BVM - Precautions

- Avoid hyperventilation
- Pause after 30 compressions for ventilation or 15 compressions if two rescuers
- No pause once advanced airway in place
- Ventilation no more than 8-10/min
- If perfusing – 10-12/min



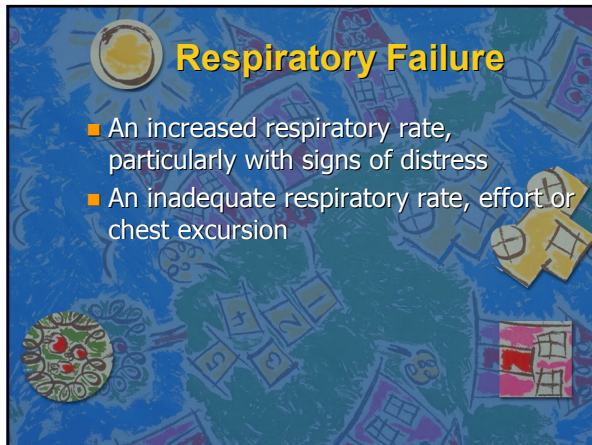
Hyperventilation

- Impedes venous return and decreases cardiac output
- Causes air trapping and baro trauma in patients with small airway obstruction
- Increases risk of regurgitation and aspiration



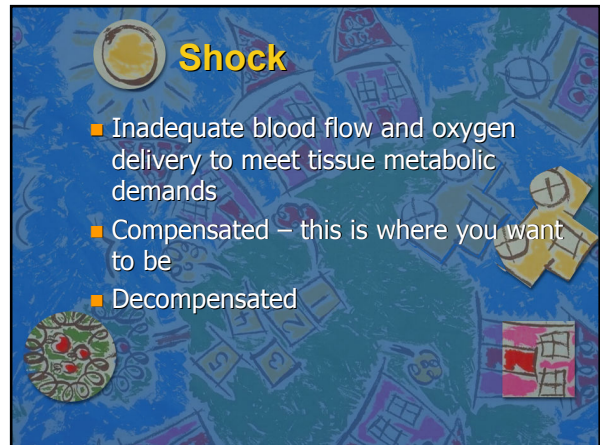
Defibrillation

- VF can be cause of sudden collapse or develop during resuscitation
- AEDs available for pediatrics 1-8



Respiratory Failure

- An increased respiratory rate, particularly with signs of distress
- An inadequate respiratory rate, effort or chest excursion



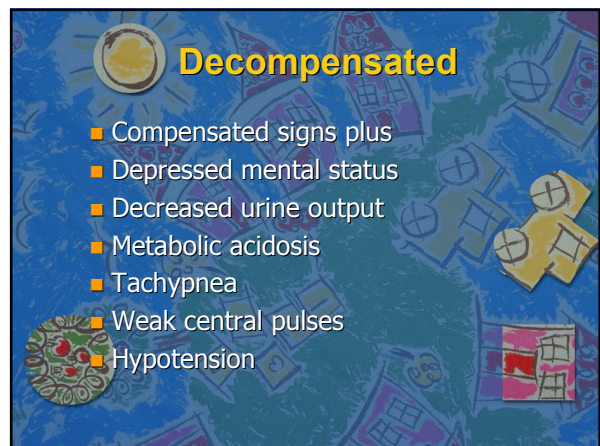
Shock

- Inadequate blood flow and oxygen delivery to meet tissue metabolic demands
- Compensated – this is where you want to be
- Decompensated



Compensated Shock

- Tachycardia
- Cool extremities
- Prolonged capillary refill
- Weak peripheral pulses compared with central pulses
- Normal blood pressure



Decompensated

- Compensated signs plus
- Depressed mental status
- Decreased urine output
- Metabolic acidosis
- Tachypnea
- Weak central pulses
- Hypotension

Shock

- Most Common is Hypovolemia
- Hypotension Defined
 - <60 in term neonates (<28 days)
 - <70 in infants (1 to 12 months)
 - <70 + 2x age in years (1-10)
 - <90 in children older than 10 years

Laryngeal Mask Airway

- Insufficient evidence to recommend for or against the routine use of LMA during arrest
- If unable to Intubate it is acceptable but associated with high complications

Endotracheal Intubation

- When at all possible should be done by those specially trained – anesthesia personnel
- Success and low complication rates are directly related to length of training, supervised experience and number per year

Cuffed Versus Uncuffed

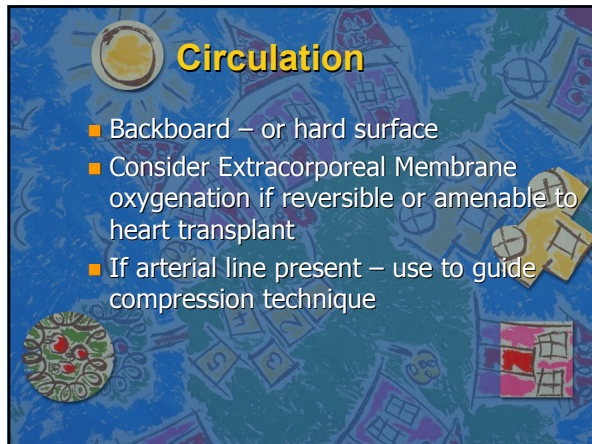
- In hospital setting a cuffed endotracheal tube is as safe as an uncuffed tube for infants beyond newly born and children

Tube Size

- Roughly equal to the size of the child's little finger
- Estimation, may be difficult or unreliable

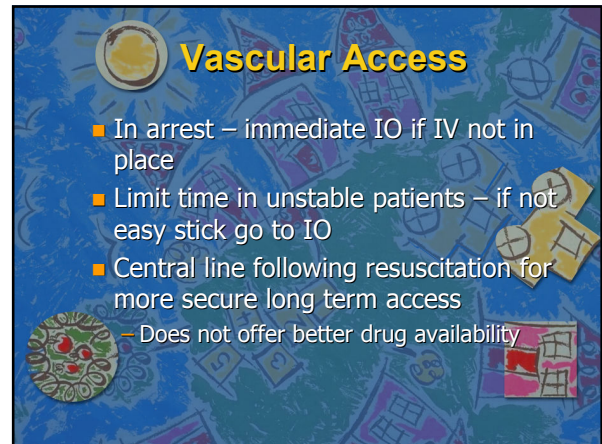
Deterioration

- Displacement
- Obstruction
- Pneumothorax
- Equipment



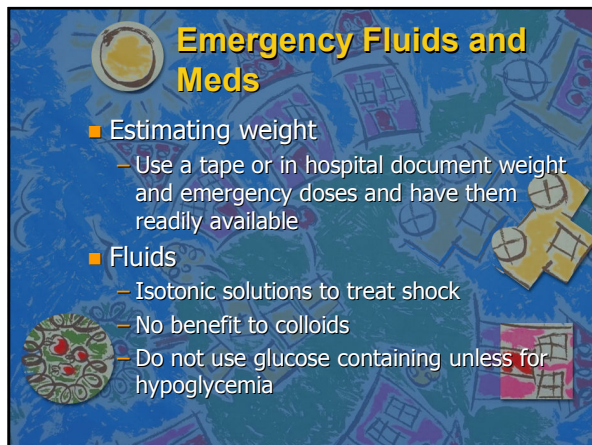
Circulation

- Backboard – or hard surface
- Consider Extracorporeal Membrane oxygenation if reversible or amenable to heart transplant
- If arterial line present – use to guide compression technique



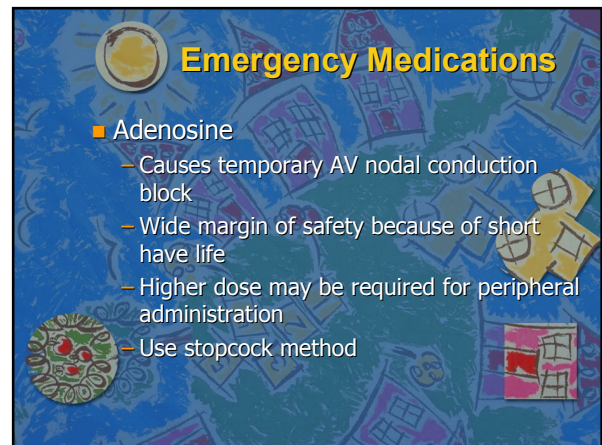
Vascular Access

- In arrest – immediate IO if IV not in place
- Limit time in unstable patients – if not easy stick go to IO
- Central line following resuscitation for more secure long term access
 - Does not offer better drug availability



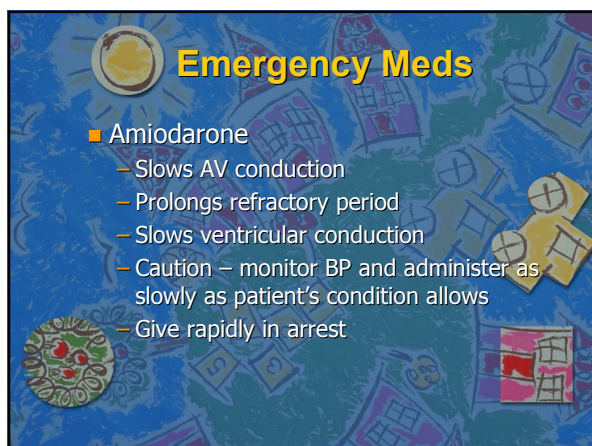
Emergency Fluids and Meds

- Estimating weight
 - Use a tape or in hospital document weight and emergency doses and have them readily available
- Fluids
 - Isotonic solutions to treat shock
 - No benefit to colloids
 - Do not use glucose containing unless for hypoglycemia



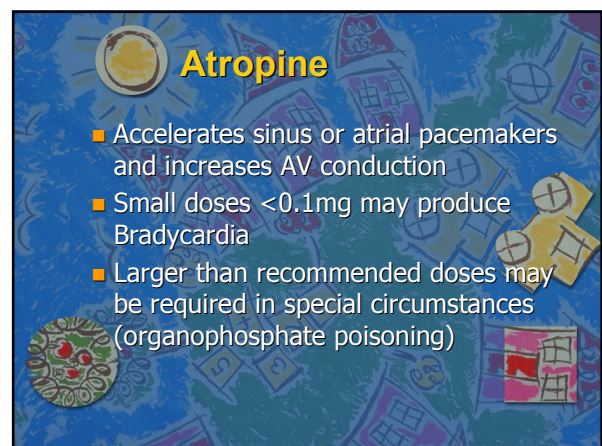
Emergency Medications

- Adenosine
 - Causes temporary AV nodal conduction block
 - Wide margin of safety because of short half life
 - Higher dose may be required for peripheral administration
 - Use stopcock method



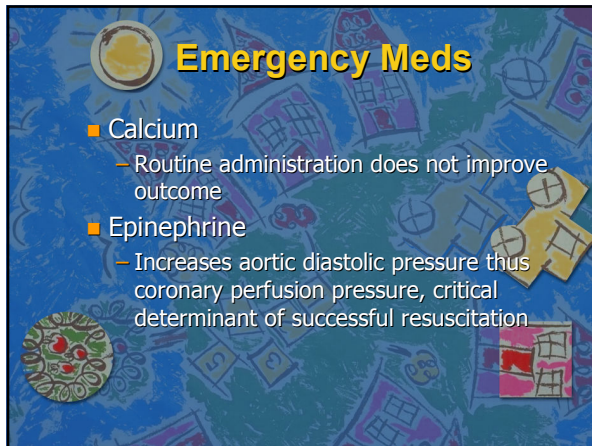
Emergency Meds

- Amiodarone
 - Slows AV conduction
 - Prolongs refractory period
 - Slows ventricular conduction
 - Caution – monitor BP and administer as slowly as patient's condition allows
 - Give rapidly in arrest



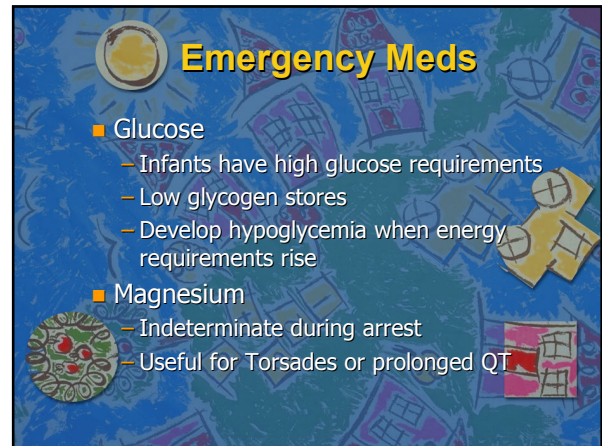
Atropine

- Accelerates sinus or atrial pacemakers and increases AV conduction
- Small doses <0.1mg may produce Bradycardia
- Larger than recommended doses may be required in special circumstances (organophosphate poisoning)



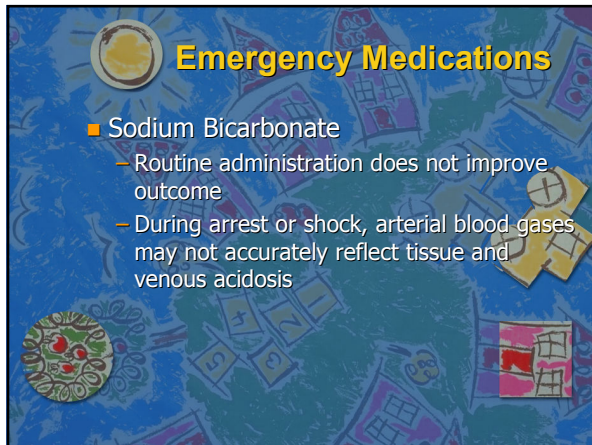
Emergency Meds

- Calcium
 - Routine administration does not improve outcome
- Epinephrine
 - Increases aortic diastolic pressure thus coronary perfusion pressure, critical determinant of successful resuscitation



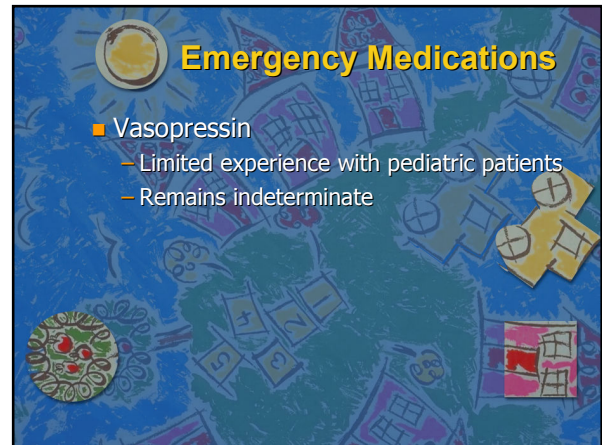
Emergency Meds

- Glucose
 - Infants have high glucose requirements
 - Low glycogen stores
 - Develop hypoglycemia when energy requirements rise
- Magnesium
 - Indeterminate during arrest
 - Useful for Torsades or prolonged QT



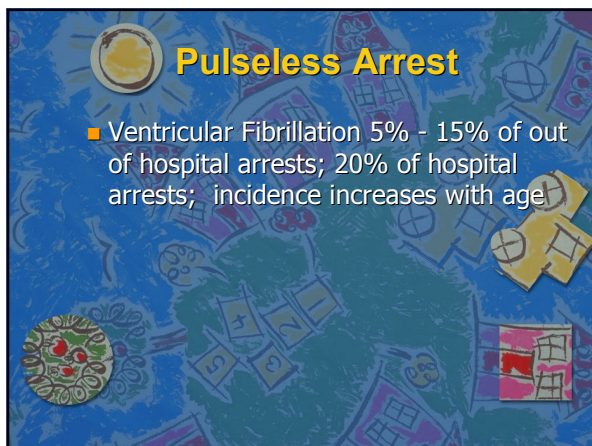
Emergency Medications

- Sodium Bicarbonate
 - Routine administration does not improve outcome
 - During arrest or shock, arterial blood gases may not accurately reflect tissue and venous acidosis



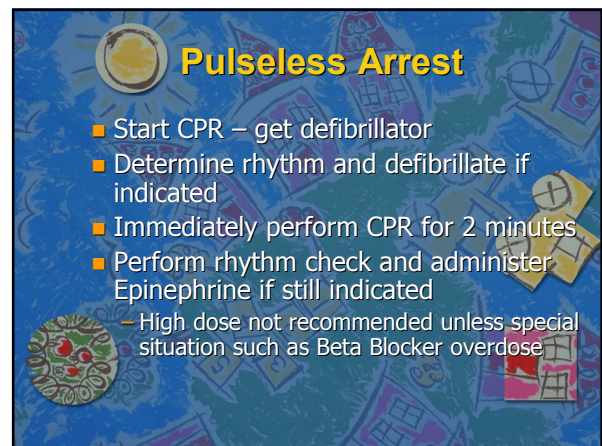
Emergency Medications

- Vasopressin
 - Limited experience with pediatric patients
 - Remains indeterminate



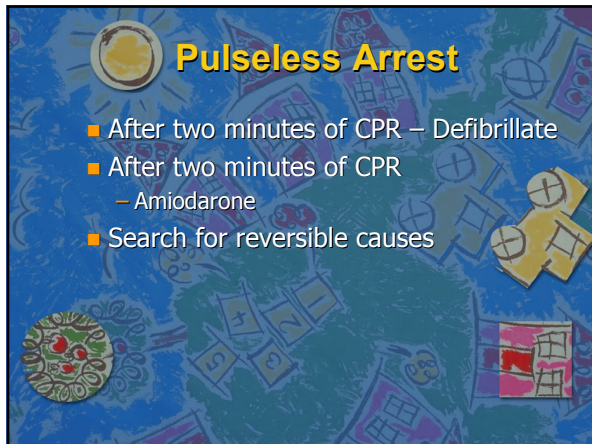
Pulseless Arrest

- Ventricular Fibrillation 5% - 15% of out of hospital arrests; 20% of hospital arrests; incidence increases with age



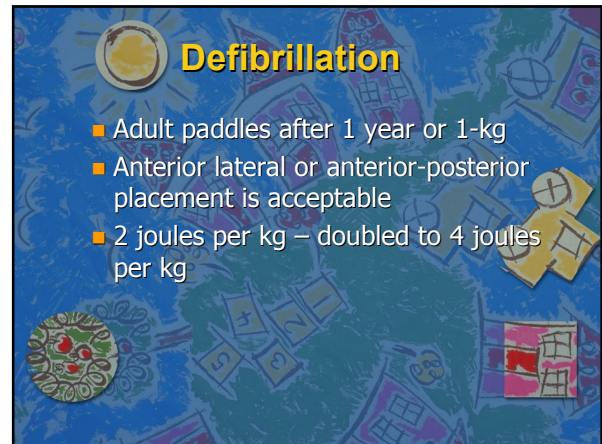
Pulseless Arrest

- Start CPR – get defibrillator
- Determine rhythm and defibrillate if indicated
- Immediately perform CPR for 2 minutes
- Perform rhythm check and administer Epinephrine if still indicated
 - High dose not recommended unless special situation such as Beta Blocker overdose



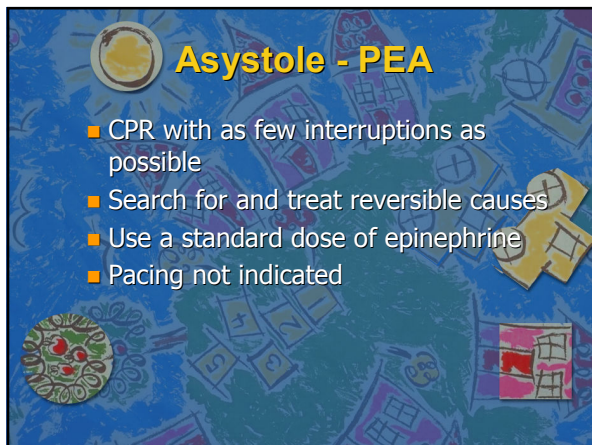
Pulseless Arrest

- After two minutes of CPR – Defibrillate
- After two minutes of CPR
 - Amiodarone
- Search for reversible causes



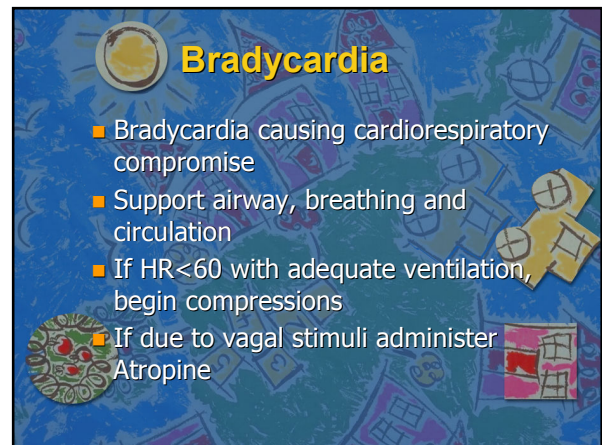
Defibrillation

- Adult paddles after 1 year or 1-kg
- Anterior lateral or anterior-posterior placement is acceptable
- 2 joules per kg – doubled to 4 joules per kg



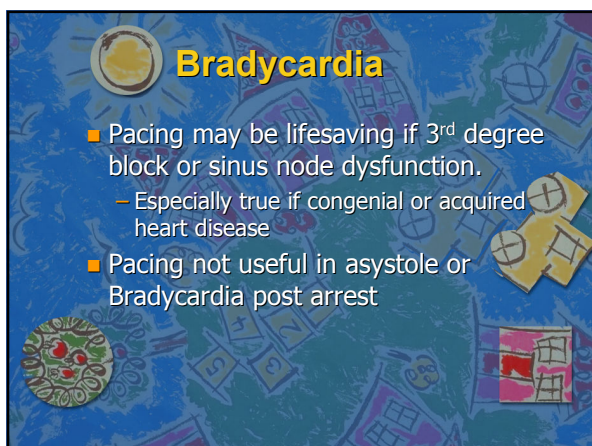
Asystole - PEA

- CPR with as few interruptions as possible
- Search for and treat reversible causes
- Use a standard dose of epinephrine
- Pacing not indicated



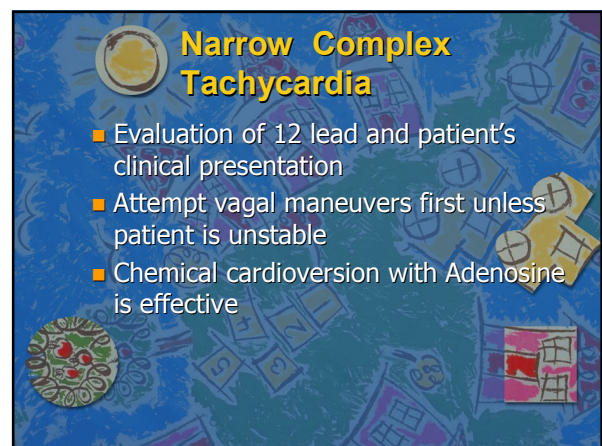
Bradycardia

- Bradycardia causing cardiorespiratory compromise
- Support airway, breathing and circulation
- If HR < 60 with adequate ventilation, begin compressions
- If due to vagal stimuli administer Atropine



Bradycardia

- Pacing may be lifesaving if 3rd degree block or sinus node dysfunction.
 - Especially true if congenial or acquired heart disease
- Pacing not useful in asystole or Bradycardia post arrest



Narrow Complex Tachycardia

- Evaluation of 12 lead and patient's clinical presentation
- Attempt vagal maneuvers first unless patient is unstable
- Chemical cardioversion with Adenosine is effective

Narrow Complex Tachycardia

- If patient unstable or no IV access, electrical cardioversion
 - 0.5 joules/kg to 1 joule/kg
- Consider Amiodarone if unresponsive to vagal maneuvers and adenosine
- Do not use Verapamil; it may cause refractory hypotension

Wide Complex Tachycardia

- Treat with cardioversion
 - If it does not delay cardioversion acceptable to try Adenosine
- If 2nd shock unsuccessful; or recurs quickly consider Amiodarone before third shock

Trauma

- Immobilize if consistent with mechanism
- Do not over ventilate even in the case of head injury
- Suspect thoracic injury even with no outward signs
- Treat shock with volume 20ml/kg up to 60ml/kg
- After 60ml/kg switch to 0-negative blood

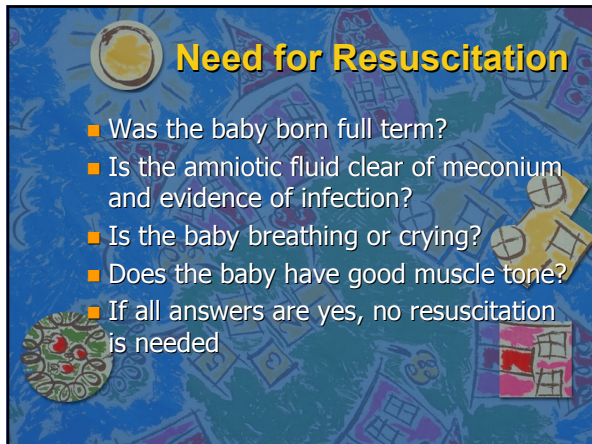


Birthin' Babies Should Take Place in the Delivery Room Whenever Possible



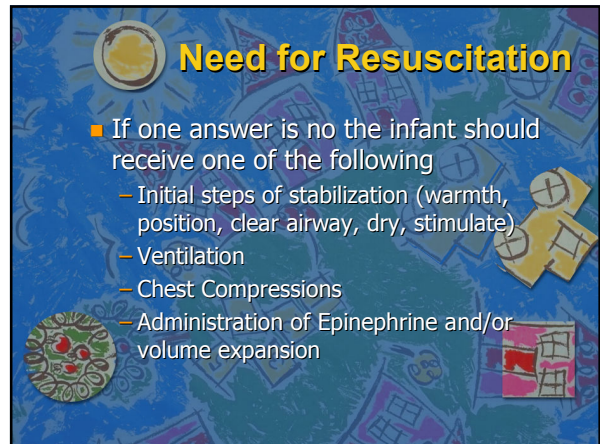
Need for Resuscitation

- 10% of newborns require some assistance to begin breathing
- 1% require extensive resuscitation



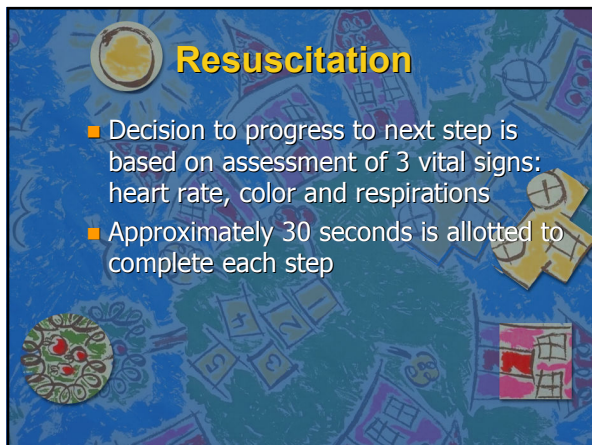
Need for Resuscitation

- Was the baby born full term?
- Is the amniotic fluid clear of meconium and evidence of infection?
- Is the baby breathing or crying?
- Does the baby have good muscle tone?
- If all answers are yes, no resuscitation is needed



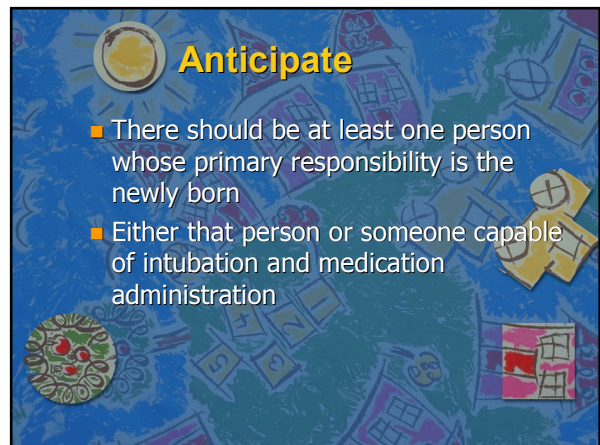
Need for Resuscitation

- If one answer is no the infant should receive one of the following
 - Initial steps of stabilization (warmth, position, clear airway, dry, stimulate)
 - Ventilation
 - Chest Compressions
 - Administration of Epinephrine and/or volume expansion



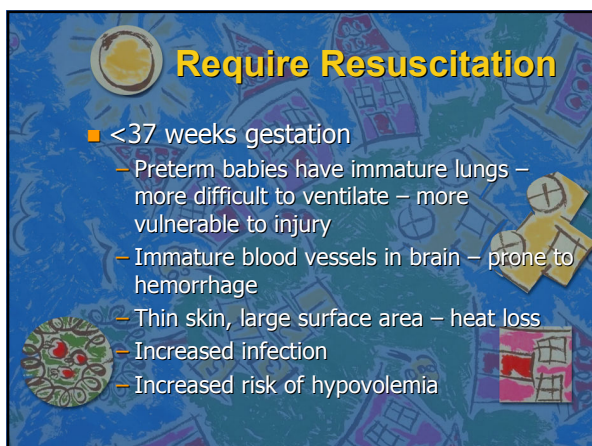
Resuscitation

- Decision to progress to next step is based on assessment of 3 vital signs: heart rate, color and respirations
- Approximately 30 seconds is allotted to complete each step




Anticipate

- There should be at least one person whose primary responsibility is the newly born
- Either that person or someone capable of intubation and medication administration



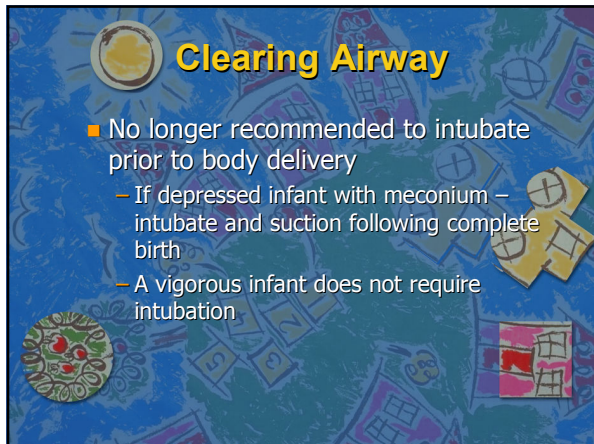
Require Resuscitation

- <37 weeks gestation
 - Preterm babies have immature lungs – more difficult to ventilate – more vulnerable to injury
 - Immature blood vessels in brain – prone to hemorrhage
 - Thin skin, large surface area – heat loss
 - Increased infection
 - Increased risk of hypovolemia



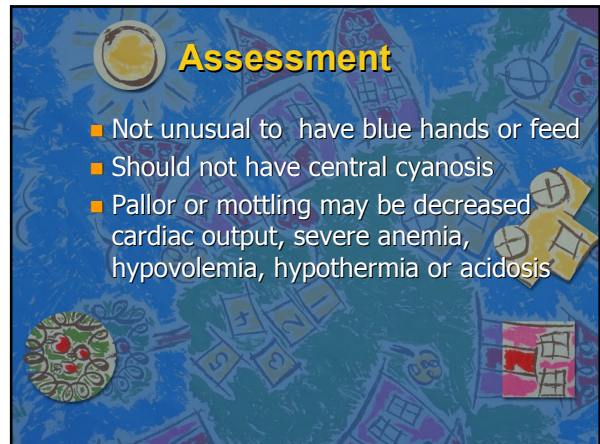
Initial Steps

- Provide warmth – place under radiant heat
- Position head in “sniffing” position
- Clear airway with bulb syringe
- Dry baby and stimulate



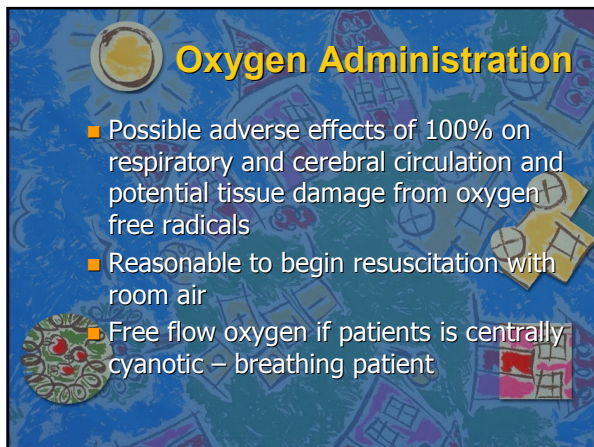
Clearing Airway

- No longer recommended to intubate prior to body delivery
 - If depressed infant with meconium – intubate and suction following complete birth
 - A vigorous infant does not require intubation



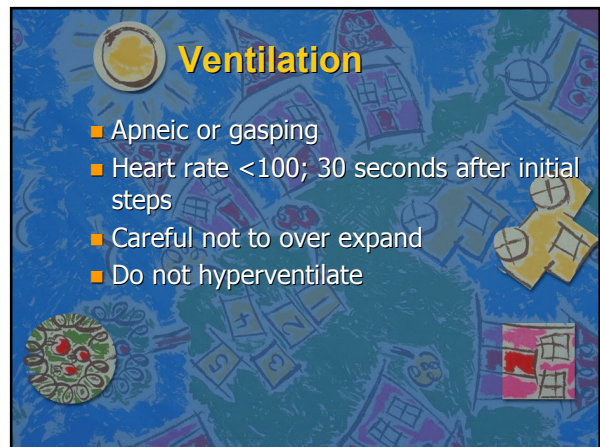
Assessment

- Not unusual to have blue hands or feet
- Should not have central cyanosis
- Pallor or mottling may be decreased cardiac output, severe anemia, hypovolemia, hypothermia or acidosis



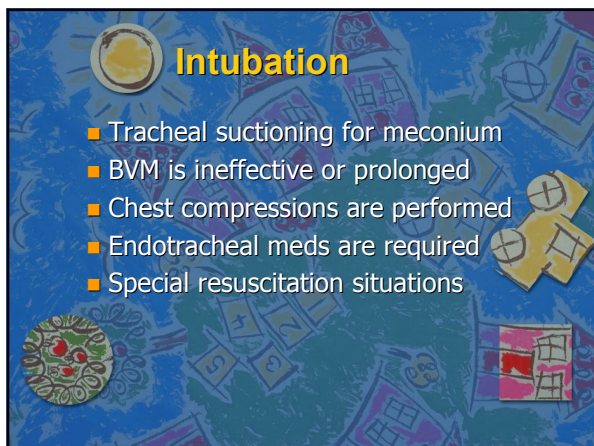
Oxygen Administration

- Possible adverse effects of 100% on respiratory and cerebral circulation and potential tissue damage from oxygen free radicals
- Reasonable to begin resuscitation with room air
- Free flow oxygen if patient is centrally cyanotic – breathing patient



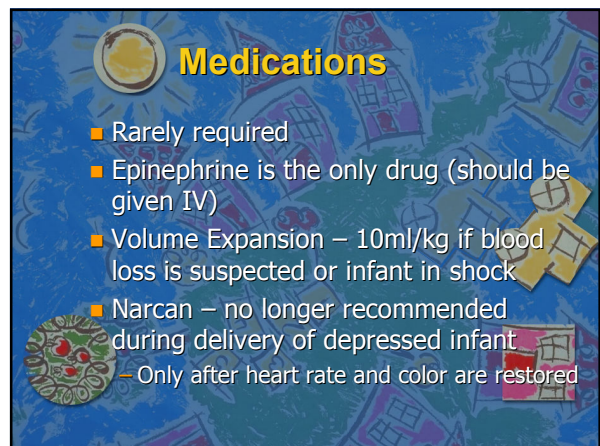
Ventilation

- Apneic or gasping
- Heart rate <100; 30 seconds after initial steps
- Careful not to over expand
- Do not hyperventilate



Intubation

- Tracheal suctioning for meconium
- BVM is ineffective or prolonged
- Chest compressions are performed
- Endotracheal meds are required
- Special resuscitation situations



Medications

- Rarely required
- Epinephrine is the only drug (should be given IV)
- Volume Expansion – 10ml/kg if blood loss is suspected or infant in shock
- Narcan – no longer recommended during delivery of depressed infant
 - Only after heart rate and color are restored

