American Heart Association Changes for Children 2006

• **Resuscitation Changes**
- Lay rescuers no longer taught to check for a pulse:
- Only taught to give compressions and ventilations to all unconscious victims
• **Lay providers** are to initiate CPR for 5 cycles of compressions and ventilations **before** going for AED or activating the EMS.
• Health Care Providers (HCP) are to assume no pulse is present unless one is found in <10 seconds.
  - Cycle compressions and ventilations unless an advanced airway is in place.
• **Health Care Providers** who witness a sudden collapse may immediately acquire and use AED and activate EMS before starting CPR.
  - If **nonwitnessed** sudden collapse then recommendations are the same as for the lay provider recommendations.
• NO Code if DNR order is available, dependent lividity, futile resuscitation, or signs of irreversible death.
• Consider NO Code if newborn <23 weeks gestation or <400 grams.
• When to stop resuscitative efforts:
  - First assure that the condition is not due to ingested drugs or primary hypothermia.
  - Specifically in Newborn: No signs of life after 10 minutes aggressive NALS.
  - All ages: "High degree of certainty" that patient will not respond to further resuscitation efforts.
  - 2 rounds of drugs and 20 minute standard not as predictive as previously thought.
• Parental presence supported by literature (and most parents' opinions).
  - When possible have a Pastor, Social Worker, Nurse, or Child Life Liaison stand by parent(s) to provide support and facilitate communication.

New focus on good compressions

• **"Push hard: Push Fast" with good chest recoil after compression**
  - Neonates 120 compressions/minute.
  - All others 100 compressions/minute.
• Do your best to have continuous compressions occurring without significant non-compressing periods. The rescuer delivering breaths should administer 8-10 breaths per minute. If the victim has a perfusing rhythm but is not breathing, then 12-20 breaths per minute should be given (one breath every 3-5 seconds)
• Once an advanced airway is placed, there is no need to interrupt compressions

• **Compression to Ventilation Ratios**
  - Neonates 3:1 (90:30/minute)
  - **All others 30:2** Except 2 Health Care Provider infant & child CPR is15:2
• **Depth of Compressions**
  - 1/3 to 1/2 chest depth
  - Confirm with Arterial-line waveform or pulse amplitude with compressions
• **How to do compressions in children and infants**
  - Keep compressions below nipple line, above xiphoid and in midline.
  - Infants: 2 fingers on sternum OK but preferable to squeeze the chest with thumbs on sternum with fingers around back.
  - Children: Use one or both hands depending on child and rescuer size and strength.

- Assure child on hard surface whenever giving compressions.

• **AED Use in Children**
  - Infants: No real recommendation from AHA on AED use in infants due to paucity of data.
  - Children 1-8 years old: attenuated AED when immediately available; otherwise regular AED.
  - Children 8+ years: use non-attenuated (regular) AED because you need sufficient current through the heart.

Airway changes

• Cuffed ETT is now acceptable for children under 8 years of age (not newborns) in in-hospital settings.
  - May choose to leave cuff deflated
  - Keep inflation pressure <20 cm H_2O
  - If inflating cuff, tube size estimate = (age/4)+3. The standard ETT size formula for uncuffed endotracheal tubes is (age/4 +4)

Tachycardia

• **Lidocaine no longer on algorithm for possible ventricular tachycardia. Use amiodarone or procainamide.**

Cardioversion and Defibrillation

• Do not defibrillate or pace asystole.
• Use synchronized cardioversion for SVT and organized VT rhythms (with pulses but poor perfusion) when rapid synchronization is possible: otherwise use non-synchronized defibrillation.
• Consider adenosine with reentry tachycardias if it can be given immediately and won't delay electricity.
• Don't have oxygen blowing over chest when you attempt cardioversion.
  - **It can lead to fires.**
• Gel pads should remain >3 cm apart.
• Use small pads in <1 year old or <10 kg
  Use adult pads in >1 year old or > 10 kg

Cardioversion

- 1st shock = 0.5-1 J/kg
- 2nd shock = 2 J/kg

-Defibrillation

- 1st shock = 2 J/kg
- 2nd and subsequent shocks = 4 J/kg I
- No more stacked shocks!

• In general, compressions should be continued until the time of the shock and then restarted immediately afterward without a pulse check.
• With pulseless arrest, start CPR and if a shockable rhythm is identified, administer 2 J/kg and resume CPR immediately.
• After 5 cycles and not before, check rhythm and pulse.
• If there is a shockable rhythm defibrillate with 4 J/kg, resume CPR and administer epinephrine (repeated every 3-5 minutes).
• Give 5 cycles of CPR (about 2 minutes) and then recheck rhythm. If shockable,

defibrillate again with 4 J/kg, resume CPR immediately and consider amidarone (5mg/kg) or lidocaine 1 mg/kg. Magnesium (25-50 mg/kg up to 2 grams) can be given for torsades.

• Continue this cycle of compressions, defibrillation and drugs.

- Recurring or refractory VT/VF should be considered potentially salvageable so resuscitation efforts should be continued if not contraindicated.

Newborns Are Not Just Small Infants!

• Events/minute, ratios, sequence and even drug dosing is different.

• Epinephrine dosing for newborns

- Always 1/10,000 concentration
- 0.1-0.3 ml/kg IV.
- 1 ml/kg ET (not terribly effective)
- Repeat every 3-5 minutes.

No High Dose Epinephrine

• High dose epinephrine definitely no longer recommended unless there is a b-blocker overdose.

• In infants and children (not newborns) the dose is always 0.1 ml/kg.

- IV concentration is 1:10,000 (1 ml = 0.1mg)
- ET concentration is 1:1,000 (l ml = lmg)

• Repeat every 3-5 minutes.

Newborns with Meconium

• It is no longer recommended to suction the oropharynx and nasopharynx at the perineum. Outcomes have not been shown to be improved with perineum suction.

• If the newborn is vigorous (Heart rate >100 beats per minute, strong respiratory effort, good muscle tone), do not try to intubate or suction, just warm and dry the baby.

• If the newborn is not vigorous, then intubate and suction immediately after birth

• **Potential Survivors Should Be Cooled!**

- If COMA after return of spontaneous circulation (ROSC), then consider cooling to 32-34°C.
- Don't try to warm patient just to have "normal temperature."
- Treat fever and seizure aggressively to keep temperatures 32-34°C.
- After arrest, consider hyperventilation only if acute/ impending herniation.

End Tidal Monitors and Detectors

• Esophageal detector devices may be used

• $ETCO_2$ Detection and Capnography play many roles in resuscitation.

• It is one of the ways to confirm proper endotracheal tube placement.

• When normal waves are seen you can be confident the tube is not in the esophagus.

• When $ETCO_2$ is not detected or the waveform disappears, you must use other means to prove that the ETT lies in the trachea and not in the esophagus.

• During full arrest, if there is no lung perfusion, one may not detect $ETCO_2$ despite the tube being in the proper position.

• If lung perfusion is occurring spontaneously or due to compressions, then $ETCO_2$ should be noted.