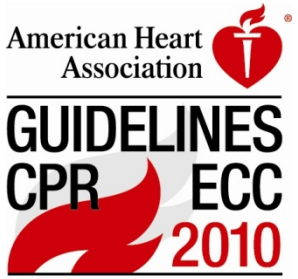
2010 Interim Materials Supplement
PALS Provider Manual
Comparison Chart
Based on *2010 AHA Guidelines for CPR and ECC*



BLS Changes			
	New	**Old**	**Rationale**
CPR	Chest compressions, Airway, Breathing (C-A-B) New science indicates the following order for healthcare providers: 1. Check the patient for responsiveness and presence/absence of normal breathing or gasping. 2. Check the pulse for no more than 10 seconds. 3. Call for help. 4. Give 30 compressions. 5. Open the airway and give 2 breaths. 6. Resume compressions.	Airway, Breathing, Chest compressions (A-B-C) Previously, after responsiveness was assessed, a call for help was made, the airway was opened, the patient was checked for breathing, and 2 breaths were given, followed by a pulse check and compressions.	Although ventilations are an important part of resuscitation, evidence shows that compressions are the critical element in adult resuscitation. In the A-B-C sequence, compressions are often delayed. Changing to CAB will delay ventilations by only ~20 seconds for the pediatric patient.
	Compressions should be initiated within 10 seconds of recognition of the arrest.	Compressions were to be given after airway and breathing were assessed, ventilations were given, and pulses were checked.	Providers' ability to accurately determine presence or absence of a pulse is limited. If a pulse is not detected within 10 seconds, do start compressions without further delay.
	Compressions should be given at a rate of at least 100/min. Each set of 30 compressions should take approximately 18 seconds or less.	Compressions were to be given at a rate of about 100/min. Each cycle of 30 compressions was to be completed in 23 seconds or less.	Faster compressions are required to generate the pressures necessary to perfuse the coronary and cerebral arteries.
	Compression depths are as follows: • Adults: **at least** 2 inches (5 cm) • Children: **at least** one third the depth of the chest, approximately 2 inches (5 cm) • Infants: **at least** one third the depth of the chest, approximately 1½ inches (4 cm)	Compression depths were as follows: • Adults: 1½ to 2 inches • Children: one third to one half the diameter of the chest • Infants: one third to one half the diameter of the chest	Deeper compressions are required to generate the pressures necessary to perfuse the coronary and cerebral arteries.

Airway and Breathing	Cricoid pressure is not routinely recommended during INTUBATION	If an adequate number of rescuers was available, one could apply cricoid pressure.	Randomized studies showed that cricoid pressure can delay or prevent the placement of an advanced airway and that some aspiration can still occur despite cricoid pressure. It is also difficult to properly train providers to perform the maneuver correctly.
	"Look, listen, and feel for breathing" has been removed from the sequence for assessment of breathing after opening the airway. Healthcare providers briefly check for breathing when checking responsiveness to detect signs of cardiac arrest. After delivery of 30 compressions, lone rescuers open the victim's airway and deliver 2 breaths.	"Look, listen, and feel for breathing" was used to assess breathing after the airway was opened.	With the new chest compression–first sequence, CPR is performed if the adult victim is unresponsive and not breathing or not breathing normally (ie, not breathing or only gasping) and begins with compressions (C-A-B sequence). Therefore, breathing is briefly checked as part of a check for cardiac arrest. After the first set of chest compressions, the airway is opened and the rescuer delivers 2 breaths.
AED Use	For children from 1 to 8 years of age, an AED with a pediatric dose-attenuator system should be used if available. If an AED with a dose attenuator is not available, a standard AED may be used. For infants (<1 year of age), a manual defibrillator is preferred. If a manual defibrillator is not available, an AED with a pediatric dose attenuator is desirable. If neither is available, an AED without a dose attenuator may be used.	This does not represent a change for children. In 2005 there was not sufficient evidence to recommend for or against the use of an AED in infants.	The lowest energy dose for effective defibrillation in infants and children is not known. The upper limit for safe defibrillation is also not known, but doses >4 J/kg (as high as 9 J/kg) have provided effective defibrillation in children and animal models of pediatric arrest, with no significant adverse effects. AEDs with relatively high energy doses have been used successfully in infants in cardiac arrest, with no clear adverse effects.

Pediatric ALS Changes			
	New	**Old**	**Rationale**
Defibrilla-tion	It is acceptable to use an initial dose of 2 to 4 J/kg for defibrillation, but for ease of teaching, an initial dose of 2 J/kg may be used. For refractory VF, it is reasonable to increase the dose to 4 J/kg. Subsequent energy levels should be at least 4 J/kg, and higher energy levels (not to exceed 10 J/kg or the adult maximum dose) may be considered.	With a manual defibrillator (monophasic or biphasic), a dose of 2 J/kg was used for the first attempt and 4 J/kg for subsequent attempts.	More data are needed to identify the optimal energy dose for pediatric defibrillation. Limited evidence is available about effective or maximum energy doses for pediatric defibrillation, but some data suggest that higher doses may be safe and potentially more effective. Given the limited evidence to support a change, the new recommendation is a minor

			modification that allows higher doses up to the maximum dose most experts believe is safe.
ECG	Wide-complex tachycardia is present if the QRS width is >0.09 second.	Wide-complex tachycardia is present if the QRS width is >0.08 second.	In a recent scientific statement, QRS duration was considered prolonged if it was >0.09 second for a child under the age of 4 years, and ≥0.1 second was considered prolonged for a child between the ages of 4 and 16 years. For this reason, the PALS guidelines writing group concluded that it would be most appropriate to consider a QRS width >0.09 second as prolonged for pediatric patients. Although the human eye is not likely to appreciate a difference of 0.01 second, a computer interpretation of the ECG can document the QRS width in milliseconds.
Pharma-cology	The recommendation regarding calcium administration is stronger than in past AHA Guidelines: routine calcium administration is not recommended for pediatric cardio-pulmonary arrest in the absence of documented hypocalcemia, calcium channel blocker overdose, hypermagnesemia, or hyperkalemia. Routine calcium administration in cardiac arrest provides no benefit and may be harmful. Etomidate has been shown to facilitate endotracheal intubation in infants and children with minimal hemodynamic effect but is not recommended for routine use in pediatric patients with evidence of septic shock	Although the *2005 AHA Guidelines for CPR and ECC* noted that routine administration of calcium does not improve the outcome of cardiac arrest, the words "is not recommended" in the *2010 AHA Guidelines for CPR and ECC* provide a stronger statement and indicate potential harm.	Stronger evidence against the use of calcium during cardiopulmonary arrest resulted in increased emphasis on avoiding the routine use of this drug except for patients with documented hypocalcemia, calcium channel blocker overdose, hypermagnesemia, or hyperkalemia. Evidence of potential harm from the use of etomidate in both adults and children with septic shock led to the recommendation to avoid its routine use in this setting
Special Considera-tions	Specific resuscitation guidance has been added for management of cardiac arrest in infants and children with single-ventricle anatomy, Fontan or hemi-Fontan/bidirectional Glenn physiology, and pulmonary hypertension.	These topics were not addressed in the *2005 AHA Guidelines for CPR and ECC*.	Specific anatomical variants with congenital heart disease present unique challenges for resuscitation. The *2010 AHA Guidelines for CPR and ECC* outline recommendations in each of these clinical scenarios. Common to all scenarios is the potential early use of extracorporeal membrane oxygenation as rescue therapy in centers with this advanced capability.

Airway and Breathing	Once the circulation is restored, monitor oxyhemoglobin saturation. It may be reasonable, when the appropriate equipment is available, to titrate oxygen administration to maintain the arterial oxyhemoglobin saturation ≥94%; an oxyhemoglobin saturation of 100% is generally an indication to wean the FiO_2.	Hyperoxia and the risk for reperfusion injury were addressed in the *2005 AHA Guidelines for CPR and ECC* in general, but recommendations for titration of inspired oxygen were not as specific.	In effect, if equipment to titrate oxygen is available, titrate oxygen to keep the oxyhemoglobin saturation 94% to 99%. Data suggest that hyperoxemia (ie, a high PaO_2) enhances the oxidative injury observed after ischemia-reperfusion such as occurs after resuscitation from cardiac arrest.
	Exhaled CO_2 detection (by capnography or colorimetry) is recommended in addition to clinical assessment to confirm endotracheal tube position for neonates, infants, and children with a perfusing cardiac rhythm in all settings (e.g., prehospital, ED, intensive care unit, ward, operating room) and during intrahospital or interhospital transport.	In infants and children with a perfusing rhythm, a colorimetric detector or capnography was used to detect exhaled CO_2 to confirm endotracheal tube position in the prehospital and in-hospital settings and during intrahospital and interhospital transport.	Exhaled CO_2 monitoring (capnography or colorimetry) generally confirms placement of the endotracheal tube in the airway and may more rapidly indicate endotracheal tube misplacement/displacement than monitoring of oxyhemoglobin saturation. Because patient transport increases the risk for tube displacement, continuous CO_2 monitoring is especially important at these times.
Post–Cardiac Arrest Care	Although there have been no published results of prospective randomized pediatric trials of therapeutic hypothermia, based on adult evidence, therapeutic hypothermia (to 32°C to 34°C) may be beneficial for adolescents who remain comatose after resuscitation from sudden witnessed out-of-hospital VF cardiac arrest. Therapeutic hypothermia (to 32°C to 34°C) may also be considered for infants and children who remain comatose after resuscitation from cardiac arrest.	On the basis of extrapolation from adult and neonatal studies, when pediatric patients remain comatose after resuscitation, cooling them to 32°C to 34°C for 12 to 24 hours could be considered.	Additional adult studies have continued to show the benefit of therapeutic hypothermia for comatose patients after cardiac arrest, including those with rhythms other than VF. Pediatric data are needed.